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INDIA RUBBER WORLD

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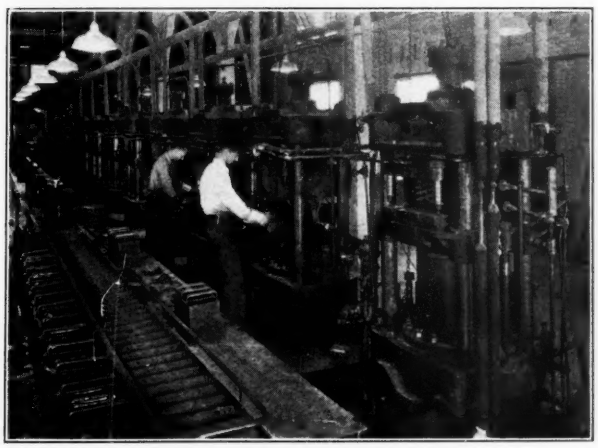
Hydraulic Presses and Other Applications of Hydraulic Power[1]

Walter L. Tann[2]

IN TREATING the subject of hydraulic presses full thought is given the fact that a great number of presses of the mechanical type do their work in a perfectly satisfactory manner for the nature of the task at hand. In fact it is readily admitted by hydraulic press builders that on some press jobs now being handled by mechanical presses a hydraulic press could not satisfactorily compete, from either the viewpoint of production results or from capital investment. The mechanical press is firmly established in industry, and there is no intention to seek to create the impression that the modern hydraulic press is in any sense to be regarded as a revolutionary tool that will have a place in every plant that has something to shear, blank, punch, draw, or form. The hydraulic press has a definite field, in which it is superior to other forms; and while some of its advantages have been known for a long time, only recently has it been possible to make full use of these advantages, owing to improvement in pumping equipment, control devices, and advances in the presses themselves.



Group of 254-Ton Battery Box Presses

History of Hydraulic Science

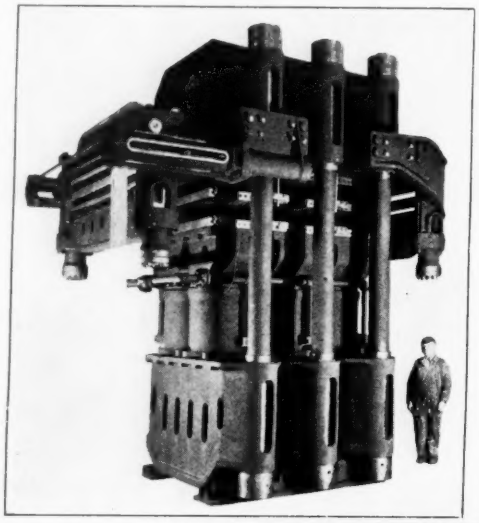
Hydraulics is a very old science, and I think the majority of those present share with me a desire to look behind the scenes of any art or science and endeavor to read the story of the pioneers, working through the years, until we come to the culmination of their efforts as we view them today. So with hydraulics we find that, as originally understood, it had for its object the practice of conveying water along artificially constructed channels for irrigation and domestic purposes. These early applications of the flow of fluids date back to the dawn of Egyptian history, and we also find them constructing canals for transit purposes for use in their many wars, as early as 3,000 B.C. Traces of hydraulic projects for the better utilization of the waters of the Nile have been found that antedate these canals by many years. According to Josephus, "the gardens of Solomon were made beautiful by fountains and other water works." Two thousand

[1] Address delivered at the meeting of Providence Engineering Society, Providence, R. I., May 7, 1936.

[2] Hydraulic engineer, Farrel-Birmingham Co., Inc., Ansonia, Conn.

years ago the aqueducts of Rome were constructed and were among the wonders of the world. Even today the city of Athens is partially supplied with water by means of an aqueduct constructed several centuries before the Christian era.

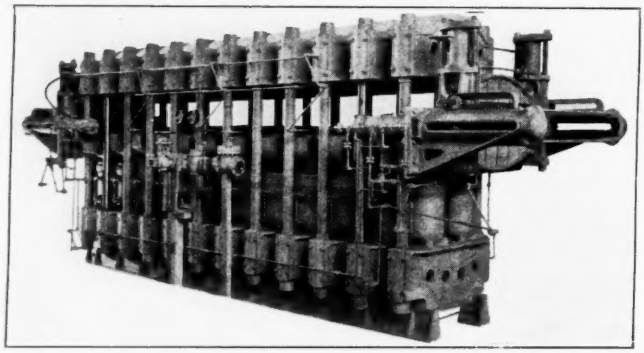
But hydraulics as an art and science slumbered on until the end of the seventeenth century when some philosophers, working on the design of fountains in Italian landscape gardens, were confronted with some problems dealing with the flow of water under pressure. These philosophers, Torricelli, Mariotte, and Bernoulli, made experiments to determine the discharge of water through orifices in the sides of tanks and through short pipes. Torricelli's famous theorem may be said to be the foundation of modern hydraulics.



74-Inch by 108-Inch Three-Platen Endless Belt Press with Hydraulic Stretcher and Clamp

But while these Italian savants had definitely proved by actual works that their theorems were more or less correct, a contemporary French scientist by the name of Pascal was evolving a theorem or law upon which the subject of our meeting tonight rests. Pascal made the following statement:

"If a vessel full of water, and closed on all sides, has two openings, the one a hundred times as large as the other, and if each be supplied with a piston that fits it exactly, then a man pushing the small piston will exert a force which will equilibrate that of one hundred men pushing the large piston, and will overcome that of ninety-nine."



56-Inch by 25-Foot Six-Inch Hydraulic Belt Press with Double Hydraulic Stretchers and Clamps

Translating Pascal's seventeenth century writings into twentieth century English, we can say that if we have one piston of one square-inch area and place one pound on it, it will create sufficient pressure to balance another piston, connected to the same hydraulic system, having an area of 40 square inches and a weight of 40 pounds; or, it would balance a piston of 100 square-inch-area weighing 100 pounds. The principle is that a force of one pound per square inch is transmitted in all directions. Now that is an elementary consideration, but it is, nevertheless, a very important law and must not be lost sight of.

Importance of Packings

Like many fundamental physical conceptions, there was a trick to this quaintly phrased law of Pascal. Note that he said that the "pistons fit the opening exactly." Well, it took over a hundred years before some one discovered how to make this exact fit and it was an Englishman named Joseph Brahmah who was responsible. In 1785 or 1786 he invented the cup packing and this resulted in the immediate use of "Brahmah's hydraulic press," which consisted of a hand plunger pump piped to a large cylinder and ram, and by Pascal's fundamental law, 200 pounds per square inch exerted on the small pump plunger exerted 200 pounds per square inch on a large piston, making sizable forces available for baling, etc. Speed of press closure was slow, of course, because of the small displacement of the hand pump. Hand pump presses are still being built today, in the small sizes, however. Brahmah's invention became popular at once in England, because of the large forces that could be obtained with it.

W. G. Armstrong, who later organized the original firm which has now grown into Vickers-Armstrong, Ltd., developed a hydraulic crane around 1845 and invented the hydraulic accumulator, which stores a large amount of fluid under an artificial head or pressure.

Early Applications

It was natural that these inventions of hydraulic machinery would find a ready acceptance in this period long previous to the development of electric power and the consequent use of the electric motor. With hydraulic power was available a fluid force, comparatively easily transmitted and utilized. So popular did this new industrial power become that sometime between 1850 and 1860 we find London and other large English cities piped for hydraulic power. Central pumping stations were built, and hydraulic pipe lines laid in much the same manner as the high-pressure fire lines in New York City and some other large centers. Thus we see the genesis of our present public utility corporations. These high-pressure water lines are still existent, by the way, although their use is very limited today.

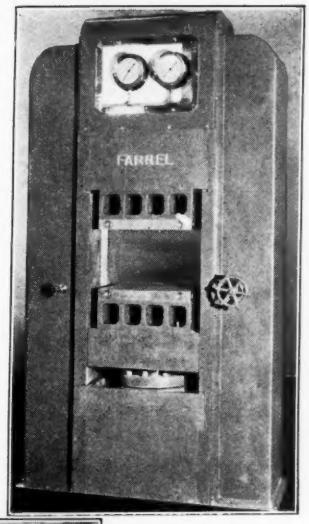
Now that we have seen a little of the beginning of the hydraulic power that makes hydraulic machinery possible, let us turn our attention to the machinery itself. There are, however, certain premises or arguments upon which the use of hydraulic machinery must be predicated, and, to repeat, it is not a revolutionary cure-all.

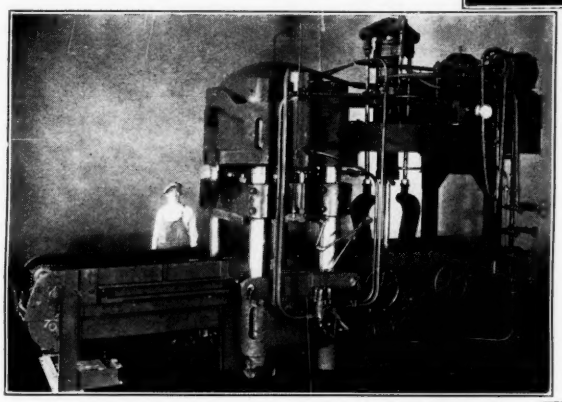
Force Transmission

Since the ancient days when man first used the lever and the wedge to move boulders or to split trees into firewood, his ability to develop and use machinery has been a story of continued progress. More than two hundred years before the Christian era, that grand old Greek philosopher and scientist, Archimedes, upon his discovery of the law of levers, had caught the conception of the transmission of force when he said, "Give me a fulcrum and a lever that is long enough and I will lift

the world!" All machinery from the simplest forms to the most complicated simply requires the means for the transmission and utilization of energy in such a way that useful work may be done. Since we know that we can neither create nor destroy energy in this process, we can only use the machine as a means to transform a small force acting through a great distance to a great force acting through a small distance.

In many processes involved in industry we find extremely large forces necessary, and in a great number of cases we find the hydraulic principle the most convenient means of producing these forces. This is so because the power may be developed or generated at one point and transmitted to another point with but small loss. At the point of use great forces or pressures





20-Inch by 20-Inch 100-Ton Rubber and Plastic Molding Press with Self-Contained Hydraulic Power Unit

42-Inch by 42-Inch 1,000-Ton Hydraulic Press and Auxiliary Equipment with Self-Contained Hydraulic Power Unit

may be produced with nothing more complicated than a cylinder and a ram or plunger. The pressure produced also has an inherent resilience behind it, quite unlike the metal-to-metal contact of cam surfaces, or the progressive throw of a crankshaft. This resilience of hydraulic power is one of the reasons for a stir of interest in hydraulic power in some industries that had either never before utilized it or had utilized it and discarded it before the pumping equipment and control systems now available had been developed.

Hydraulic Limitations

Hydraulic power is especially adapted to comparatively slow moving machinery with straight line or reciprocating motions, actuated by high pressure. Hydraulics, as yet, has found but small application in the field of high-speed machinery with low pressures, or, with but few exceptions, in the field of rotary motion. Of course we are not considering tonight the field of hydro-electric power generation or similar branches of the art. The prime fields for hydraulic applications are the compression or compacting of loose or plastic materials, the shearing, punching, forming, drawing, and forging of metals, the moving of heavy weights, and special applications such as hydraulic lifts or elevators with enormous platforms, where variable speed is required or where structural conditions dictate the application of the hydraulic principle. All these applications involve relatively slow movement, straight line motion, and heavy forces, produced without the intervention of gear trains, toggles, or cranks. Notice that high-speed rotary motion is not included. From the foregoing we can recognize the limitations of hydraulic power as well as its peculiar advantages.

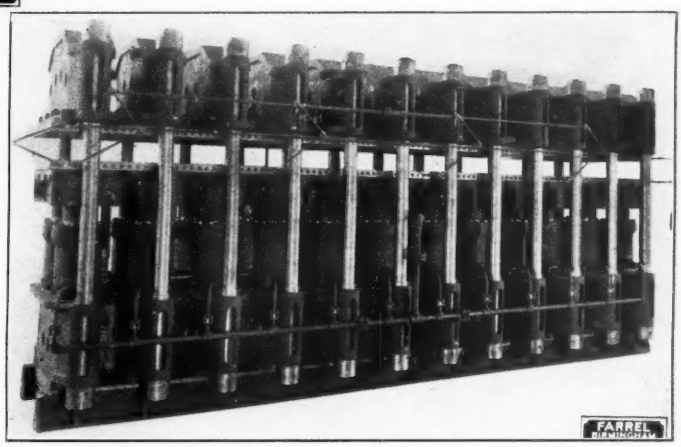
Four Press Classes

Hydraulic presses fall into four broad and general classifications. First, presses for use in the plastic industries, handling material such as rubber, composition flooring materials, inlaid linoleum, and that new and aggressive industry which I am going to call "Plastic Molding" and which produces molded products from such materials as Bakelite, Textolite, Micarta, Beetleware, Plastine, to mention only a few from over 800 different trade names. In mentioning these few names, it has been only with the object of seeking to have you identify the process in a broad way.

The second classification of hydraulic presses is that of metal working presses, and broadly this includes shearing, punching, drawing, and forming metals, and it is particularly the latter field that is exciting quite a bit of interest today.

The third group includes hydraulic forging presses, which I am separating from the above classification of metal working presses owing to the difference in application of hydraulic power, as well as their enormous size as expressed in terms of tonnage applied to the work.

Then in conclusion I am going to gather up the presses or application of the cylinder and plunger principle in one fourth and last group and call it miscellaneous. This will include dehydrating presses, baling presses, forcing presses, such as wheel presses, hydraulic elevators.



60-Inch by 30-Foot Two-Platen Matting Press

That is quite a formidable list to examine in detail, especially when one considers that it covers the range from a small five- or ten-ton capacity laboratory press, equipped with a hand pump, on up to an armor plate forging press of 15,000 tons capacity, and starting with a platen perhaps eight or ten inches square and ranging up to the hydraulic elevators at Radio City Music Hall in Rockefeller Center, New York City, where the entire

stage and orchestra pit are raised and lowered on hydraulic plungers. These elevators are 70 feet long by 16 feet wide and have a total lift of 42 feet.

But the principle back of every one of these applications is the same and was expounded by M. Pascal away back in the seventeenth century. I have often thought that if it is possible to look back from Wherever We Go From Here, the old gentleman must get a great chuckle out of watching some of us at times when we are endeavoring to make "the piston fit the hole exactly" as he so neatly put it. Those of us who are maintenance engineers recognize that M. Pascal was the type who concerned himself only with the larger things.

Mechanical Principle

We have heard how Brahmah's invention of the cup packing made the hydraulic press a reality, and it still is true that without a packing suitable for retaining the pressure exerted against the ram we could not have the hydraulic press or hydraulic machinery in any of the forms we are considering tonight. Essentially the hydraulic press consists of a cylinder in which is fitted a ram or piston that passes through a packing and a gland. To the ram is attached a platen or bolster which engages the work to be compressed, formed, or punched. The work is placed upon the fixed platen maintained at a fixed distance from the cylinder by means of tension rods or side frames.

In some designs of presses, depending upon the character of the work or operation, the ram and moving platen or bolster move upward; while in other designs they move down to engage the work. In presses used in the plastic industries the more common practice is to have the ram move upward; while in the metal industries the down acting ram is used. It is obvious that the rising ram is the cheaper construction because when its work stroke is finished and the operating valve opened to exhaust the cylinder, the ram will descend by force of gravity. In the other type of ram that descends to the work auxiliary cylinders are necessary to raise the ram when its work stroke has been completed.

These auxiliary cylinders may be of the so-called "push-back" type, which are single-acting rams, effective only during the return stroke of the main ram, or they may be of the "pull-back" type, consisting of double-acting pistons, effective during both the working and return stroke of the press. The use of these types is governed by the application of the press, the speed of operation, and the functioning of the control system.

The mechanical design of the hydraulic press consists principally of designing (1) the cylinder casting, which is usually integral with either the top or bottom platen or crosshead, so that it will safely withstand the bursting stresses imposed upon it by the high hydraulic pressure and keeping deflection within the limits imposed by the pressing operation to be performed on the press; (2) the fixed platen or crosshead to withstand the bending imposed upon it by the action of the press, keeping its deflection within proper limits; (3) the moving crosshead or slide to resist the same forces; (4) the tie or tension rods of sufficiently large cross-section area to keep the tensile stress low enough to avoid stretch, which would throw the crossheads out of alinement. Eccentric loading on the press platens produces a couple or moment resulting in combined tension and bending on the tie rods, which combined forces may bring the total stress almost up to the elastic limit of the material, and here the trouble begins. Therefore due consideration must be given to the possibility of eccentric loading, but suffice to say that almost every metal working press will have eccentric loading to some degree and, therefore, the allowable stresses are kept low.

Types of Packing

The foregoing is a general description of the mechanics of the hydraulic press, fairly complete with but one exception, that is, the subject of packing. Packing is such a controversial subject that I am not going to enlarge upon the virtues of any particular type. No one type of packing material will suit all applications. The most common packing material is twisted or braided flax, hemp, or cotton, impregnated with a lubricant and formed into desired shapes. As this type of packing is made in strands, it can be cut to any required length. Packings of this type are comparatively inexpensive, and some kinds are good for high operating temperatures. They are not particularly desirable for high-pressure service or where excessive frictional drag is objectionable.

One of the best packing materials for normal temperature service is leather. It has good wearing qualities and is able, in the proper form, to withstand high pressures. Owing to the gelatine mass in oak-tanned leather this type of leather packing is liable to become hard when used in temperatures above 150°. Chrome-tanned leather is usually considered good for temperatures as high as 200°. Oak-tanned leather is usually not affected by fluid mediums used in hydraulic pressure systems, but chrome-tanned leather is sometimes decomposed by certain types of oils. The U-leather packings have given satisfactory service for pressures as high as 12,000 pounds per square inch. Higher pressures than this seldom occur in regular hydraulic service; in fact this pressure is exceptional and is encountered most frequently with steam or hydraulic intensifier systems where the high pressures are localized.

Other types of packings used in hydraulic work are the V-type, which may be of either leather or molded composition. When a double-acting ram is used, either for main ram service or for pull-backs, piston rings are often used in place of molded or leather packings.

A Maintenance Factor

A knowledge of the proper way to install new packings has a great bearing on their life. Carelessness in installation may so damage a packing, of whatever type, that its usefulness as a pressure seal is seriously impaired from the start. No other detail in the maintenance of hydraulic machinery is the cause of so much expense and annoyance as the packing. Not only the labor and expense of packing maintenance, but the loss of production due to a machine shut down will be excessive if carelessness in packing installation or a neglect of certain fundamental principles is indulged.

Packing is also required for the hydraulic operating valves and is subject to the same remarks as the ram packing. Valve packing is not subject to deterioration from heat, as does ram packing when used on presses with heated platens, as in the plastics industries.

The methods for producing the hydraulic power, and the control of the power, vary with the particular application of the hydraulic press. For instance, the pressure plant necessary to serve a battery of rubber vulcanizing presses varies widely from the pumping equipment needed by a high-speed metal-forming press. And the control system for the vulcanizing press is much simpler than the combined hydraulic, electric, and pneumatic control used on the metal-forming press. After we look into the details of the various types of hydraulic presses, we will return to the subject of hydraulic power generation and control.

(*To be continued*)

An Unparalleled Problem

The Rubber Industry's Major Difficulties Developed from Uncontrollable Conditions

Walter H. Dickerson

FROM the beginning of time wars between nations have been engendered by a lack of understanding on the one hand and unusual conditions on the other. Invariably the flame of hatred has been kindled by lighter-minded critics who made no attempt to seek the real fundamental source of possible misunderstanding.

In the case of this industry unprecedented price wars have resulted from unparalleled problems which have tested and broken strong men and companies. Here, too, the constant harpings of unqualified or disgruntled critics have intensified the situation and played a large part in delaying the solution of problems which can and are now being solved.

"It is much easier to be critical than to be correct."
Disraeli.

"Nothing is easier than faultfinding: no talent, no self denial, no brains, no character are required...."
Robert West.

To even intimate that leaders in the industry are to be held blameless for many and costly errors would brand one as hopelessly idiotic. To say that the unsatisfactory earnings record is entirely the result of poor management is equally idiotic.

Management is entitled to the benefit which should result from a clearer understanding of its past problems. In fairness, its strong points should be made known. It should be encouraged in its present efforts for constructive cooperation.

As executives have struggled against the whirlpool of conflicting economic forces, no adequate effort has been made to give the public a proper presentation of their problems; men in a lifeboat are concerned with saving their lives, not with their future. What has been done in this connection has usually reflected the offhand viewpoint of an individual rather than the studied opinion of an authority.

The purpose of this article, however, is not to defend the industry or anyone in it. It is the intention to make a fair presentation of a few outstanding problems which have delayed the solution of more normal ones, in the belief that constructive comment will assist in the restoration of public confidence in the industry, confidence which is more fully warranted.

More than at any time in the last twelve years the industry is in a position to make real and constructive progress under more normal conditions than have prevailed for it during that period. True it is that the industry is confronted with the political uncertainties which becloud the future of all American business and with a tax burden several times greater than a few years ago, but in the five years prior to 1929 the rubber industry went through a period decidedly more hazardous.

As a background of consideration four important points regarding the industry must be established. They are:

An Essential Industry. No other industry has contributed more to present-day standards of living or is more essential in the maintenance of those standards.

A Troubled Industry. No major industry has been confronted with certain types of problems so intensively as has the rubber industry.

A Progressive Industry. No other industry has made more notable improvement in its manufacturing efficiency and in its products.

A Deserving Industry. No other industry is more entitled to reap a reward for its progress or is better prepared to enter upon a period of successful and profitable operations.

The above statements are broad; they require amplification. The fourth in particular requires qualification. In the following process of elaboration and qualification effort will be made to present all facts constructively.

An Essential Industry

To appreciate the essentiality of the rubber industry it is necessary only to visualize the breadth of its manufacturing activity in relation to modern requirements. When rubber is mentioned, one immediately thinks of tires which have made possible the automobile of today. Few realize, however, that the motors ride on cushions of rubber and that automobiles are dependent upon rubber for brake linings, fan belts, water hose, and batteries, and that rubber is also utilized in many places to lessen vibration and to increase safety and motoring comfort.

Now rubber manufactures play an important part in modern civilization, second to no other products. Without such goods it would be impossible to have electric lights, telephones, radios, automobiles, elevators, high-speed tranportation of any kind on the earth, in the air, or on the high seas. Mechanical rubber goods are used in some form in every large manufacturing establishment in the United States. Rubber footwear and clothing safeguard our health; druggists' sundries are essential in maintaining it; rubber sporting equipment adds to our enjoyment of it; and it is to be remembered that practically every popular athletic game is dependent upon balls, made entirely or in part of rubber. One should readily think of over a hundred ways in which rubber plays an important part in one's own personal life in addition to the other countless numbers of rubber products. In fact, two companies each manufacture over 30,000 different rubber articles.

A recent report issued by the *NRA Division of Review* stated, "The Rubber Manufacturing Industry is not a growing Industry, and it will be doubtful if the volume of production attained in 1928 and 1929 will be reached again for some years to come."

Measured by crude rubber consumption, the rubber industry in the United States has experienced the great-

est volume in its history during the last twelve months. New products are constantly being developed. The statement quoted above unfortunately is but one of many inaccurate conclusions drawn in the report and is typical of the prevalent hastily drawn conclusions.

A Troubled Industry

It was slightly less than one hundred years ago that Charles Goodyear discovered a means for vulcanizing rubber by treating it with sulphur at a high temperature. With that discovery the industry was born, and during the next seventy-five years it experienced a gradual growth with the development of new products.

With the advent of the automobile, however, expansion became exceedingly rapid. Many rubber companies began to manufacture tires, springing up for that purpose throughout the northeastern quarter of the United States until several hundred companies had established themselves in this business, which proved profitable for many. Promoters made the best of a golden opportunity to capitalize the rapid expansion which took place.

Thirty years ago there were less than 90,000 automobiles registered in the entire United States. Six years later there were ten times that many, and the following six years saw the total swell to over 6,000,000.

Bear in mind that the tire industry started practically from scratch only a little over thirty years ago. Solid tires had been used for buggies and pneumatic tires for bicycles, but the wearing demands made upon such equipment were comparatively slight. Tires were made by hand, and no companies had been able to establish reputations for their products which would give them a competitive advantage over the fly-by-night outfits springing up everywhere.

Survival of the Fittest

For such a period of mushroom expansion a day of reckoning must always come, and for the tire industry it culminated at about the time of our entry into the World War. Since 1917 there has been a steady decline in the number of tire companies and, in a somewhat lesser degree, in the number engaged in the manufacture of other rubber products. At one time there were believed to be over 300 tire manufacturing companies, but today only about 25 remain as independent organizations.

It has frequently been stated that the companies which have failed were forced out of business deliberately by the larger surviving companies. Without some qualification such a statement is either deliberate slander or false conclusion. The competition which has prevailed undoubtedly did put an end to many smaller companies, but five of the ten largest companies of 12 years ago also failed to survive without financial reorganization, and the other five were largely assisted through by the grace of timely financing. No company escaped the effects of the most ruthless competition which has confronted any American industry.

The writer has been asked often if this in itself is not sufficient to cause stockholders to demand the complete retirement of participating management, which means the management of practically every rubber company. Before passing judgment on this question it is only fair to consider the problems which led up to such a situation.

Basic Profit Factors

As in nearly every manufacturing industry, three principal factors control earnings: first, the purchase of raw materials; second, manufacturing efficiency; and third, the sale and distribution of manufactured products.

In this article it is impossible to go into great detail as to the respective problems. Consequently they will be stated briefly, except in respect to the purchase of crude rubber, wherein the industry has experienced wider and sharper fluctuations in the price of its principal raw material than has ever confronted any major American industry.

The Crude Rubber Problem

Prior to the birth of the automobile industry the world's supply of crude rubber all came from the jungles of a few tropical countries, principally Brazil. To obtain it necessitated sending expeditions hundreds of miles into the interiors at heavy cost and risk of life. Very fortunately the far-sighted British had conceived the possibility of scientifically growing rubber trees in their Far Eastern possessions and had for several years been clearing the jungles and developing plantations for that purpose.

By a strange coincidence these plantations began to come into bearing at the time the automobile industry was cutting its first teeth, and for several years they increased in importance, hand in hand. Were it not for this fact the increased use of automobiles would have been retarded by the higher price it would have been necessary to pay for increased supplies of wild rubber.

In 1910 crude rubber sold well over $2 per pound. During the war the price averaged about 60¢ per pound, but by 1922 it had declined to as low as 12¢ per pound. Bankruptcy threatened the plantation industry, in which an enormous amount of capital had been invested in the years required to bring the plantations to the bearing stage. This condition led the British government to adopt a plan of production control in 1922, the Stevenson Scheme, which had as its objective the reduction of excess stocks and an increase in price to about 30¢ per pound.

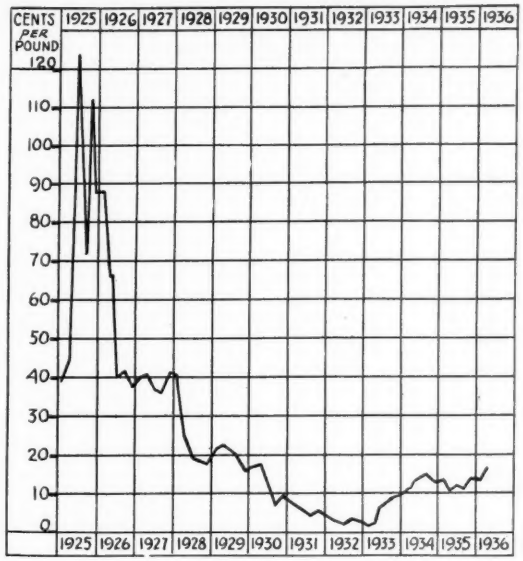
By early 1925 the market had advanced to that price with a reduction of world stocks. Coincident with the spurt in automobile production in 1924, balloon tires were introduced. They required more rubber, and they also immediately became popular. The Stevenson Scheme was not elastic, and more rubber was required than was available. Moreover the source of supply was on the other side of the world. By July, 1925, the price had soared to a high of $1.23 per pound, and in the same month seven years later it sold at 2⅝¢ per pound, which was more than $1.20 per pound less than the 1925 price. The intervening price changes were frequently sharp and wide as will be noted from the accompanying chart which covers the period from 1925 to 1936.

A Gamble, Not Judgment

Bear this in mind. As the United States is so far from the source of supply, it is necessary for manufacturers to have several months' supply, at least, on hand, in process, and in transit. Several manufacturers were forced out of business in 1925 because they were too short of rubber; and others were forced out in 1926 because they had a few months' supply more than the average. In either period, whether a manufacturer had a three- or six-month supply was more a matter of luck than good judgment, but the difference to some meant a boom, to others bankruptcy. Three distinct and separate market moves in crude rubber in 1925 were so wide that in each case the extreme fluctuation applied to a three months' supply was greater than the working capital of some tire companies. In that year the difference between the low and the high market price, approximately 90¢ per pound, multiplied by the number of pounds used by any tire manufacturer, gave a result

which nearly equaled its entire gross sales of tires for the year. No company, of course, bought all its requirements at the top or bottom, but the above will enable the reader to visualize how easily one false step could have put any company out of business, and did many of them.

It will be interesting to observe how luck frequently affected the difference. Early in 1925 upon my insistence an official of a leading mail-order house purchased an additional 600 tons of future rubber at about 35¢ per pound. A few days later the market had receded slightly; so the gentleman wrote a stinging letter stating that advantage had been taken of him and that he had really been forced to make the additional commitment against his own judgment. Only four months later, however, that contract for only 600 tons, and for the largest companies 600 tons was only a few days' supply, could have been liquidated at a profit of nearly one million dollars. Forgetful of his letter, the gentleman later commented upon his good judgment.



Crude Rubber Price Fluctuations

Take another example, one of many which could be cited. A small tire company with a working capital of about a million dollars decided to buy a portion of its 1926 requirements in 1925 as protection against certain forward sales it had hoped to close. The contract for tires was finally divided between two factories, and the liquidation of a few hundred tons of excess rubber practically wiped out the company's entire working capital; the lawyers got the rest.

Rubber Prices and Business Disasters

Certainly large competitors had nothing to do with either of these purchases. Violent price fluctuations in crude rubber were responsible for more casualties than price competition, disastrous as that has been.

Manufacturers have done everything in their power to develop substitutes and synthetic rubber and to improve the use of reclaimed rubber, and phenomenal progress in these directions has been made in the last few years. But the rapidity of price movements from 1922 to 1934 was not of their making, and to a large degree they were helpless. Crude rubber is essentially a tropical product; it takes years to develop plantations, and to do this it is necessary to locate them in foreign territory. Three large and one medium-size manufacturer have plantation interests, but these are subject to foreign control, as in the case of the present International Rubber Restriction Agreement.

Another Erroneous Idea

It is well at this time to point out another erroneous conclusion drawn in the NRA report previously mentioned, as it is a rather common one. Under the heading "Disparity in Costs to Large and Small Manufacturers" the report implies that large manufacturers can buy their rubber requirements cheaper than their small competitors. In the case of an advancing market the contrary may be true. Rubber is sold at so much a pound. In buying two or three hundred tons the large manufacturer will pay the same price as the smallest, unless the latter has a poor credit, which may occasion a slight premium. The small manufacturer, however, can frequently buy several months' requirements without disturbing the market; whereas in a sensitive market should the large buyer desire to accumulate even two or three weeks' additional supply, he may have to pay advancing prices which will more than offset the credit premium paid by the smaller company.

Serious fluctuations in rubber prices are not likely in the next two or three years, in the writer's opinion, and the industry has demonstrated an ability to make money in years when violent declines or their immediate aftermath have not been present.

Rubber Prices Cause Product Competition

Has not a reflection of the violent fluctuations given the reader a clearer understanding of a cause which would necessarily lead to keen competition in sales? Every manufacturer used his own judgment in making purchases. Had it been practical for all to own and have commitments for the same month's supply during the years from 1922 to 1930, this article would not be necessary. As it was, however, following sharp declines manufacturers were forced to reduce prices to meet competition of those factories having the shortest rubber position; in rising markets companies with the longest rubber position failed to raise prices in an effort to hold volume.

Competition and prices for manufactured products were buffeted about by a rubber market, which was for the manufacturer largely a guessing contest.

A Progressive Industry

No industry has shown greater efficiency in manufacturing or made more notable improvement in its manufactures. In fact, the improvements made in finished products and in manufacturing processes, together proved a boomerang to the industry. Together these two achievements resulted in excess plant facilities, and so rapidly had remarkable developments been made that it was impossible to depreciate fixed assets correspondingly. To no small extent has unexcelled manufacturing efficiency on the one hand contributed to unparalleled destructive competition on the other.

Sales Competition

In respect to destructive competition the industry stands guilty as charged by a legion of critics. Not only have profits been sacrificed, but capital assets have been dissipated. The writer only asks that readers, before passing judgment, again reflect upon the extent to which an uncontrollable rubber market and unsurpassed manufacturing achievements have been causes, unsound competition a result.

A Deserving Industry

The American public and automobile manufacturers

have long been on a dole, paid by the stockholders of rubber companies in the form of manufactured products furnished at profitless levels. No other industry is more essential to the American public, which by proper publicity should be acquainted with interesting and pertinent facts. The number of tires in use is governed by the number of automobiles, and price wars never increased consumption of tires over a period of time. Strangely enough, the contrary is true. The American public will gladly pay fair prices for the things which serve them best.

The industry is prepared to enter upon a period of successful operations for several reasons previously mentioned. In addition it should be stated that leading companies have maintained a strong financial condition and are in a position to take advantage of improving business. The excess plant capacity is not large as compared to other major industries.

Stabilization Assured

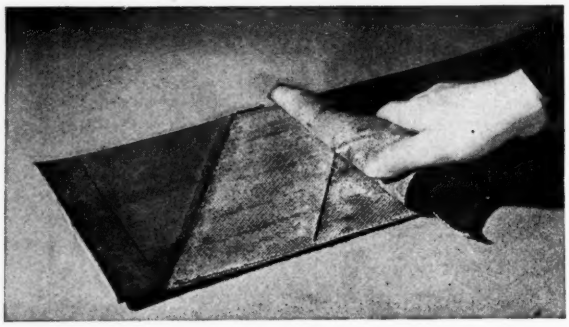
Manufacturers are making harmonious and lawful efforts to secure improvement in competitive conditions. It may be added that a large part of previous tribulation has been caused by executives and companies no longer a part of the industry and by boards of directors, in some instances exceedingly weak, negligent, or both.

Many other factors not mentioned here will contribute to the improvement which lies ahead for the industry. Taxes and labor, governmental interference and political uncertainties which becloud all industry are problems which rubber executives must face, but face them they will, steeled with the knowledge that they have faced even more hazardous ones.

There are many constructive steps which the industry should take now to promote its own welfare, steps desired by all and which conflict with none. Past problems are minimized in most instances and eliminated in some; the decks are cleared for action. The responsibility of every director, officer, and employe in every company is to play the game honestly and squarely, with the knowledge that stockholders, labor, customers, and managements are all entitled to consideration. The government has failed to promote an industrial Utopia and always will fail. The safest way for any industry to avoid governmental interference is to prove itself capable of self-government.

New Belt Splicing Method[1]

A Complete Belt Splice Done in One Hour by Means of the Air-Acetylene Flame



A Rubber Belt Specimen Unspliced to Show Method of Cutting Layers

THE splicing of rubber power belting through the use of the air-acetylene flame is a method which has recently been brought to attention and which appears to have unique time saving possibilities. For this work the use of the air-acetylene flame introduces a carefully controlled, intense source of heat.

The two pieces of belting to be joined are first cut at an angle in such a way as to produce a finished lap, in the case of eight-inch belting, of about 28 inches for the completed joint. In handling wider belting, the lap is made proportionately longer.

The first layer of fabric is then stripped off, and a further cut is made at the same angle and deep enough to remove another layer of fabric. This progressive step cutting procedure continues until one-half the thickness of the belt is removed. The number of cuts made is, of course, dependent on the size or thickness of the belt. The other end of the belt is then prepared in the same manner, with the angle of the cuts made in the opposite direction. This is so that the two pieces will fit together and have a final thickness no greater than the original thickness of the belt.

The two pieces are then cleaned so that all excess rubber is removed down to the fabric. Care must be used in doing this so that the threads of the fabric are not injured. Balata gum cement is then applied carefully. Excess cement should be removed from the corners of the cut. If excess cement were left there, or the cement were not dry enough, gas pockets would be created when the air-acetylene torch was applied to the two pieces during the final heating operation. It is recommended that cement be applied two or three times, allowing each layer of cement to dry thoroughly. This is particularly true when splicing very large belting. In the case of an eight-inch belt the cement is applied twice.

The two pieces of belting are then ready to join. It is preferable that the belt now be placed in a press and made perfectly flat and even. Then the torch flame is applied, and the entire surface over the lap joint is heated thoroughly. Care is taken to prevent burning the fabric or discoloring the surface. The movement of the torch flame over the surface should be rapid. In the case of

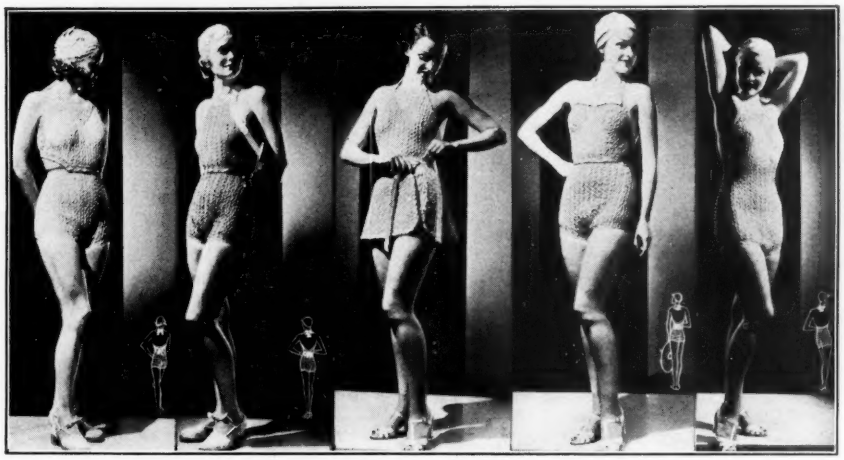
(*Continued on page* 42)

[1] Reprinted from *Oxy-Acetylene Tips*, June, 1936, p. 133, by permission of Linde Air Products Co., 205 E. 42nd St., New York, N. Y.

Rubber Beach Wear

New Types of Materials and Methods of Manufacture Improve Appearance and Quality

THE summer season of 1936 finds the needs of vacationists, particularly those attracted to beach sports, more abundantly supplied by rubber goods than ever before. Rubber bathing apparel came a few seasons ago as a fad that spread quickly because of the novelty of the idea, the relatively low cost of the garments, and the brilliant colors and combinations of the styling. Almost as quickly the fad waned when the results of poor aging, the quality debilitating effects of sunlight, and the rubber odor objections were experienced. Technicians, stylists, and engineers were not content to let this field of volume outlet vanish for such reasons; consequently they drew on creative ability to produce quality and appearance effects to meet the requirements of the most fastidious person.



Seamless Rubber Co. Gulf Stream Cloqué Bathing Suits

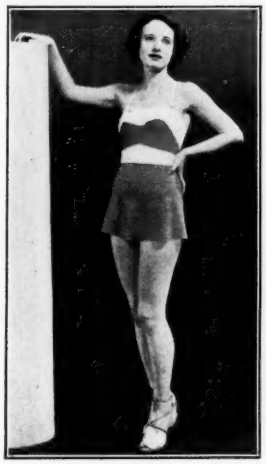
Hot Cured Materials

Acid cured goods have been virtually eliminated in the new lines; latex and heat cured goods supplant them. The compounding technique in both instances has accomplished strength and age and light resistance; while the use of aromatics has eliminated the obnoxious odor. Each manufacturer has succeeded in perfecting means of producing rough surface effects which add to the rich appearance of the garment as well as to the utility.

Methods of Production

The Seamless Cloquéing effect is a patented calendering process whereby the raw sheeted gum is passed through a series of differentially speeded calenders, one roll of each being helically ribbed to produce its operation that together results in the permanently crinkled and soft feeling surface of the cured sheet. Other manufacturers have patented means of calendering sheets of gum alternately on the opposite sides of fabric netting with tension applied suitably to draw one of the surfaces into uniform and desirable roughness. Still others obtain aeration by puncturing films of wet latex depositions and by spreading layers of that material over air pitted surfaces in a manner that causes the expanding gas to perforate the sheet during the drying stage before cure.

The objectional characteristics of bathing apparel seem to have been quite effectively and promptly met with the assurance, therefore, that popular acceptance will continue to grow. The comfort of almost instantaneous draining and drying, not possible with wool or cotton, coupled with the attractive styles and colorings herein illustrated and described will surely justify that growth of rubber business.



Miller Two-Piece Decollete Suit with Crepe Surface and Seer-O-Crepe Trim—Two-Piece Bra Suit in Seer-O-Crepe

Cloqué Rubber

The Seamless Rubber Co. recently introduced the Cloqué suit in four models: one-piece with fish-net inserts; and two-piece, with square neckline and white tie straps, with V-neck and white lapels, or with V-neck and solid color straps. Sold separate is a tie-on wrap-around skirt, adaptable also as a cape.

These suits, in

three sizes: small, for women 95 to 110 pounds; medium, 110 to 130 pounds; and medium large, 130 to 160 pounds, appear in croisette pink, red coral, aloha blue, pirate yellow, turquoise, and white. Many advantages are claimed for Cloqué creations: last longer than ordinary rubber suits, possess a 3,200-pound tensile strength, resist sunlight, do not fade, fit smoothly, and have a surface design like fabric.

Miller Bathing Attire

Miller Rubber Co., Inc., makes five types of suits, small, medium, and large. The two-piece bra model, of smooth, heavy-gage rubber, is decorated with corrugated edging and a nosegay. The one-piece halter, in junior misses' size also, exhibits a crepe finish and a plain-surface bow in front. These two suits come in white, powder blue, coral, and sea green. The two-piece decollete suit comprises one-piece maillot and brief skirt. The former, fastened by braided cord, has a crepe surface bordered with contrasting Seer-O-Crepe, resembling shirred fabric. A pure gum strip reenforces the neckband inside. The separate skirt, not slit, is of crepe rubber topped with Seer-O-Crepe. Colors include wine or turquoise with white trim and Bagdad with powder blue. The two-piece dressmaker suit, in white, wine, coral, and turquoise, consists of regulation shorts over which goes a one-piece garment of smooth stock, medium weight. The upper has a gathered effect, high cut in front, shirred around middle, and neckband with tying tape. The overlapping skirt part has a shirred waistband snapped on in the back. Another two-piece bra suit appears in single-ply Seer-O-Crepe in white, gold, wine, or turquoise. The top reveals a continuous neckband held together in front with a smooth bow. Ribbons tie in back. The trunks snap-button on. The reverse of the Seer-O-Crepe surface design is quite pronounced, eliminating any rubbery feel, making it comfortable, and conforming readily to every movement of the body.

Goodrich Styles

The B. F. Goodrich Co. contributes three one-piece suits, also in small, medium, and large sizes. The halter model, cut like a child's sunsuit, displays two-tone ribbon trim; straps tie at neck and waist. In white, red, blue, or green crepe finish this suit is made, too, in junior misses' size. A crepe finish maillot has a shaped bandeau top and halter straps tying around the neck. A two-color scroll trim outlines neck and bandeau. Hues employed are white, wine, powder blue, or sea green. The soft suit features the Sea-Crepe finish worked in two directions. This model, in white, wine, coral, and turquoise, halter ties; its bodice is plain finish.

Kleinert's Fashions

I. B. Kleinert Rubber Co. features Krepe rubber bathing suits in three sizes: small (100 to 115 pounds), medium (115 to 135), large (135 to 150). One style, one-piece halter with braided rubber straps, utilizes stockinet reenforcement at the back and crotch. This suit, in white, pink, yellow, royal blue, dubonnet, or turquoise, is also made with a skirt attached. The two-piece frog-trim model shows a white top and trunks in dubonnet, royal, brown, turquoise, yellow, or pink. Another one-piece suit, with coil trim, boasts a separate skirt useful as a cape. This outfit comes in pink with dubonnet, turquoise or dubonnet with white, white with royal, and yellow with brown. Another one-piece suit sports a polka-dot bodice, in white or yellow with bodice in white, yellow, and brown; royal with white, royal, and powder blue; dubonnet with white, royal, and dubonnet; turquoise with white, brown, and turquoise polka dots.

U. S. Rubber Swim Suits

United States Rubber Co. presents suits in Krepe-Tex, Kool-Tex, Lace Kool-Tex, and Fabric Kool-Tex. The last two introduce entirely new materials. The suits, all featuring the uplift bra, range in size from petite, for the average person between 100 and 115 pounds; small, 115 to 130; medium, 130 to 145; to regular, 145 to 160.

Kool-Tex styles, of perforated latex in a new design, groups of hexagons giving the suit its coolness and comfort, come in two styles: one-piece skirtless and two-piece scarf top and snap-on trunks. These appear in deep sea blue, sunflower, seashell, and black; all are reversible, with alternate side of white.

Fabric Kool-Tex suits combine the advantages of fine fabric and the fit, freedom, quick drying, and gorgeous color of rubber. They are made by applying liquid latex to a special white twill. These suits come in the one- and two-piece models. Both tie with flat woven rope and show an overall pattern in blue, brown, white, coral, or black against a white background.

Lace Kool-Tex is a perforated air-conditioned latex suit with a relief pattern simulating lace against a foundation of white or self-color. These suits are manufactured in the same models and colors as Fabric Kool-Tex except that the lace Kool-Tex are reversible, having an alternate side of white.

Krepe-Tex suits appear in a new herringbone texture in deep blue, turquoise, sunflower, seashell, white, black, fern green, brown, and red. All suits are scientifically designed to prevent trapping of water; the one-piece carry fishnet inserts, in reality outlets. Several styles appear, one-piece: with fishnet inserts under attached skirt, or with printed top, cotton rope tie, and diamond shaped fishnet inserts, or with cotton halter tie and seahorse inserts; and two-piece: with halter neck, flat woven rope tie, and snap-button flaring trunks supplied with undersupporter, or scarf and trunks model either with chevron-star-eagle insignia, white stripe down sides, and flat white rubber tie on upper, or with flat rubber knot ties and white enamel buttons.

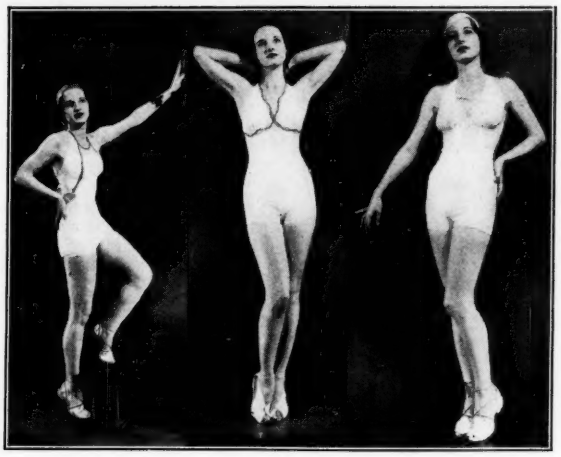
For men is offered swim wear of Kool-Tex or Fabric Kool-Tex. Both embrace two styles: two-piece, top and trunks (that can be worn separate) with white stripes down sides, or trunks alone with white adjustable belt. In white, blue, or black, all suits are white lined. Sizes are small, for 26- to 30-inch waist; medium, 30 to 34 inches; large, 34 to 38 inches.

Bathing Caps

Cap styles vary widely: diver, aviator, turban, beret, toque, coiffures, sport hat, skull, off-the-face, etc. These are neatly trimmed or have the rubber patterned in a variety of effects, as pompons, bows, tassels, piping, ruching, pinking, fagotting, knitting, ribbing, crepe, corduroy, velvet, lace, basket weave, bands, stripes, bubbles, blocks, dots, scroll, braid, coils, flowers, leaves, nautical devices, scenes, and insignia, stars, rope, nets, fish, frogs, seahorses, fish scales, wings, tear drops, horseshoes, hair arrangements, etc. This headwear appears also in colors and textures to match suits.

Seamless Rubber announces two new numbers, "Doubleton" and Ring Seal. The former, reversible head-shaped aviator or diver, has a "corded" surface design in colors and a white lining of the same design. The Ring Seal features patented inner rings for a waterproof seal. It is molded, aviator or diver, with "Seafoam" surface design outside and "Kelp" design inside.

Miller in its assortment shows a sunshade hat fifteen



Goodrich One-Piece Halter—Crepe Finish Backless Suit—Sea-Crepe Finish Suit

Kleinert Frog-Trim Suit—Krepe Rubber Suit with Dotted Bodice

Kleinert Sturdi-Flex Foundation

inches across, with head opening. This accessory comes in white bound with wine, green, or blue. Another unusual beach hat is the sunbonnet with brim to shade the eyes and ruffle to protect the back of the neck, in solid white or trimmed with wine or turquoise.

Beach Footwear

Footwear for sea or land attracts many styles, shades, patterns, and heels. Available are sandals, slippers, oxfords, espadrilles, ghillies, and strollers. Materials used are sponge rubber, cork, latex-treated fishnet, fabrics, maple wood, crepe rubber. Cut-out patterns and embossing in several effects, as Knitweave, cotton fabric, pigskin, seersucker, fishnet, and herringbone, are prominent; while straps, cord ties, snap fasteners, or buckles hold the footwear secure.

U. S. Rubber Latex Cap with Velvet Texture—Printed Turban Effect in Krepe-Tex

U. S. Rubber this year introduces Beach Strollers, in five styles, all with cork-and-crepe sole. "Chic" is a high-heeled, cross-strap model in brilliant colored fabric, having fishnet toe, natural maple wood heel, and metal arch. A stroller with a maple Cuban heel is in cross-strap effect held by a bright rope tie. A somewhat similar sandal presents a narrow awning stripe cross-strap design. Another style fastens with a flat adjustable strap and buckle. The low-heeled stroller has a wide awning striped cross-piece, open toe, sponge rubber innersole, and rope tie. The metal arch is an exclusive feature on several U. S. shoes.

Capes

Although rubber capes seem designed for rainy weather, they are welcome at beaches. Newest capes envelop several styles, tones, materials, and trims. Many sport the monk's hood; some have armslits; while others emulate the caped cadet coat. Fitted shoulders are important. Colored snap fasteners predominate. Smooth satiny rubber, Pebble Crepe, Krepe-Tex, and Fleece Nap are utilized. Contrasting color and surface effects also are used. Shades include blues, greens, browns, yellows, red, white, black, grey, pink, and orchid. Lengths run from 30 to 50 inches.

Kleinert suggests a shawl and beach throw, short in front, but extending to a long point in back, with contrasting collar and border.

Different is the "Kapecote" of the Plymouth Rubber Co. It comes in popular colors, buttons down the front, has a Peter Pan collar and huge bell sleeves edged with picot, the patented piping.

Other Accessories

Another requisite is the beach bag. Shapes are rectangular, barrel, square, semi-circular, or pouch. Materials comprise linen crash, rubber, rubberized fabrics. Handles are wood, cord, or self-material. On some bags zippers or buttons serve for fastening.

U. S. Rubber Lace Kool-Tex Suit—Fabric Kool-Tex Swim Suit—Krepe-Tex with Herringbone Texture—Fabric Kool-Tex for Men

Kleinert's prints abound in beach or nautical scenes and emblems in blue with red and white, brown with orange and white or with pink, tan, or turquoise, dubonnet with royal and white, turquoise with brown and white, or solid tones alone.

Many women prefer skin-tight panties under swim suits. Seamless offers Briefs, steam

(*Continued on page* 42)

The Evolution of Rubber in Discrete Particle Form[1]

A New Path in Development

T. R. Dawson, M.Sc., F.I.C., F.I.R.I.[2]

A PROMINENT disadvantage of normal rubber practice has always consisted of the high investment requirements of massive processing equipment and also the extremely high cost incident to the preparatory operations. Much of the business lost to the rapidly growing synthetic plastics industry has been due to these factors, not to the advantageous cost or quality of such plastic materials.

The relatively new development, powdered rubber deserves and is receiving concerted attention by scientists owing to the great promise that it holds of transforming the traditional rubber preparatory handicaps into practical simplifications that mark modern progress. Practical rubber men as well as technicians everywhere recognize the vast importance of keeping abreast of the progress of this development and its numberless possibilities of advantageous application; therefore Mr. Dawson's article will be very helpful. EDITOR'S NOTE.

IMPORTANT developments have recently taken place in the production of rubber in the form of a fine powder. The idea of preparing powdered unvulcanized rubber is not very old, but already progress has been made from the earlier products which were more of a rubber crumb type to the later finely divided powders. The first process was patented by the Dunlop Rubber Co. in 1930, and involved the formation of crumb rubber containing a large proportion of compounding ingredients, formed by adding the ingredients to latex (B.P. 327,451). This process and the applications of the crumb have been developed in a dozen further British patents.

In the De Schepper process, patented in 1932, and operated by the Rubber Powder Co., Ltd., latex is sprayed on to a drying surface such as a drum or endless belt, and the dried particles are removed by scraping (B.P. 392,592). This powder contains zinc stearate as an agent to prevent agglomeration. Quite a different process has been devised by Martin and co-workers at the Imperial Institute. In their method the latex is coagulated and the wet coagulum is disintegrated by passage between tightly closed rolls. This treatment reduces the coagulum to a coarse crumb, which can be converted into a more finely divided product by passing it while still wet through a mechanical disintegrator. The friable nature of the coagulum can be increased by adding a small proportion of sodium nitrite or by adding compounding ingredients to the latex before coagulation (B. P.'s 395,775, 396,880, and 410,875).

In the United States, Noble has developed a method which is being operated by the Heveatex Corp. In this process the latex is flocculated and the flocculent mass is separated from the serum, granulated, and dried to a powder of particle size somewhat finer than 20 mesh (U.S.P. 2,019,055).

A further type of rubber in particle form has been developed by the Rubber-Latex-Poeder-Cie. According to the patents of Stam and other reports, the particle size is in the same order as that of the rubber particles in latex. This powder is prepared by spraying latex in very small drops into an ascending current of hot gas. The addition of anti-agglomerating substances to the latex, and/or the dusting of the particles for the same end, makes it necessary to have a certain proportion of non-rubber constituents, and "Pulvatex," as the powder is named for marketing purposes, contains about 10% of ammonium phosphate, magnesium carbonate, and zinc oxide (B.P.'s 388,341 and 438,230).

The availability of raw rubber in a crumb of granular form suggests the opening out of many novel applications of rubber and ways and means of reducing costs in a variety of standard processes. The further development of a really fine powder of unvulcanized rubber does still more to increase the possible and probable opportunities for new uses.

Surface Applications

Considered in the first place solely as material capable of being sprinkled, air-blown, or otherwise distributed in thin layers, it is evident that there are openings for replacing many other powders in industry by rubber, thus obtaining the advantages of chemical resistance, waterproofing, and mechanical resilience peculiar to rubber. Since rubber powders can now be applied in fine layers, it is possible to attach raw rubber coatings by means of adhesives, or by means of the natural adhesiveness of raw rubber itself, to any surfaces requiring mechanical or chemical protection. For example, coatings may be given to parts of machinery subject to vibration, shock, or blows; to pipe lines and vehicle parts subject to corrosion; to surfaces of airplanes subject to abrasion; to fabrics; and even to walls and roofs. Special matt and corrugated effects are readily obtained, and as the powder may readily be colored with dyes or mixed with pigments by simple stirring, there will be no difficulty in devising decorative and artistic effects, schemes of words and other symbols, and so on, in such coatings. Raw rubber surfacing of this type can readily be cold-cured or vapor-cured; or if sulphur and accelerators are mixed with the powder or absorbed from solution into the coating, the usual hot vulcanization methods can be adopted with further opportunities of molded designs and effects.

Simple Molding Mixtures

Again, owing to the fineness of subdivision, the powders are readily mixed with almost any other ingredients

[1] Reprinted from *Bull. Rubber Growers' Assocn.*, Apr., 1936, pp. 153-58.
[2] With the Research Association of British Rubber Manufacturers.

to form both loose mechanical mixtures and moldable plastics. The earlier British patents, for example, refer to scores of raw rubber and gutta percha plastic compositions, intended to be used for molding under pressure, with or without heat. Both soft and hard products come into question. Vulcanization is not applied in many cases, but by the addition of sulphur and accelerators vulcanization can be effected simultaneously with hot molding. Rubber powders offer materials for forming compositions of this type as compared with the Para and other wild rubbers utilized by the earlier patentees. Although such plastics have long been superseded by vulcanized rubbers, it is quite within the bounds of possibility that rubber powder will give the best of them new commercial opportunities. This is all the more plausible since the advent of synthetic resins, and the developments in the field of natural gums and resins, have much widened the scope of suitable bonding agents. That such plastics are capable of being turned into a wide variety of articles appears in almost every page of the old patents. Here, for instance, is the suggested field of application of a single composition (B.P. 2,962/1,859):—"The compositions . . . may be used for the following purposes and objects, viz.—Sealing all kinds of bottles, as a substitute for pressed leather, the manufacture of surgical splints, fancy boxes, decorated vases, state and other seals, impressions of type and stereotype, medals, duplicates of engraved plates, to replace engravings on wood, metal, or plaster for printer's purposes, dental purposes in the making of bases or holders for artificial teeth and taking impressions of gums, teeth, and other parts of the mouth, and for filling teeth, taking impressions of objects to be reproduced by 'galvanic plastic,' making moulds in which to run plaster, making artistic objects and decorations of picture frames and all kinds of furniture, rollers and spindles for spinning-machines, the imitation of all kinds of wood and leather, artificial coral, picture frames, photographic and mirror plate frames, replacing wood, ivory, wax, cloth, and other substances on which photographs are 'adopted,' all kinds of tubes, machinery straps, saddles and straps for horses, soles for boots and shoes, funnels for filtering purposes, decorations for carriages and railway cars, geometrical instruments and globes, making parts of artificial limbs, chessmen, toys, forms or moulds, imitations of marbles, baskets, measures for liquids, handles, flower-pots, speaking trumpets, cylinders for printers and spinners, buckets for liquids, to inlay or plate furniture leaves of artificial flowers, dolls' heads, buttons, and other articles for which metal, wood, bone, plaster, and wax are used."

Although this catalogue has its humorous side, it may well serve as a practical reminder that a first-class molding plastic is capable of seizing a very wide market. Rubber powder may, one day, be making all the articles enumerated and many others.

In the many cases where rubber solutions have been used for mixing with such fibrous materials as cotton dust and fiber, hair, ground cork, wood dust, leather dust, and other relatively coarse granular fillers, the solvent being subsequently evaporated, rubber powder will probably mix directly, thus avoiding the expense and risks attendant on the use of solvents. Such coarse mixtures find application as resilient filling agents in footwear, upholstery, and concrete roads, for heat and sound insulation, and for weatherproofing buildings and other exposed structures.

Adhesiveness Can Be Restored

In all the applications so far foreshadowed it is clear that where the adhesiveness of rubber powder comes into question—in paints, coatings, and plastics, for example—steps may be taken to pretreat the powder to improve adhesion. In its marketed form, from the very fact that the fine particles are required to be stable and not to agglomerate, the powder is not specially adhesive. So it may be anticipated that treatments of the powder with heat, or with chemical reagents (solvents, oxidizing bodies, reactants that remove the protective mineral matter, and so on), or admixture with gums, resins, and oils, may be resorted to for the purpose of securing better adhesiveness and bonding power.

Dispersion Possibilities

Turning to another field of usefulness, finely powdered rubber offers an attractive raw material for physical and chemical transformations. Thus many of the problems involved in dispersing rubber—in water to form synthetic latices; in oils for lubricants, and use in transformers and oil-impregnating cables; in bitumen and concrete for roads and pavings, and for waterproofing buildings; in paints, in linoleum matrices, and in similar liquid and semi-liquid compositions—may respond to the appearance of powdered rubber. In those cases where the dispersion requires the expenditure of a large amount of energy to disrupt masses of rubber, as in water; or requires heat, as in oils and bitumen; or chemical pretreatment, as in linoleum and paint, it may well result in much saving of money and time to start with a fine powder.

It is clear also that powders can very readily be mixed into pastes and slurries of many types, for direct spreading on fabrics, metals, wood, and other surfaces. Such wet coatings can be consolidated under pressure, dried, and vulcanized by any of the usual methods.

In the case of purely chemical reactions—isomerism of rubber to form cyclo-caoutchoucs, hydrogenation, oxidation, chlorination, for example—it is usual to work with the rubber in solution to improve its reactivity and to facilitate the formation of homogeneous derivatives. Finely powdered rubber can be reacted directly with many reagents, thus eliminating costly solvents and capital charges for solvent recovery plant.

In this connection there seems to be opportunity for exploiting the possibilities of heterogeneous chemical derivatives. There is little point in the surface transformation of massive pieces of rubber to form blocks and irregular fragments consisting of, say, 95% unchanged rubber and 5% of transformed surface layers, but such treatment of a fine powder would yield uniform particles possessing at one and the same time the resilience and other mechanical characteristics of the rubber core and the special resistant or other attributes of the modified surface. The possible advantages of such powders, simultaneously elastic and of predetermined surface properties, may well open up new fields of usefulness.

Reduction of Processing Costs

Having considered powders as such, as an ingredient in plastics, pastes, and dispersions, and as a material for chemical attack, there remains the very wide field of normal rubber processes and products, in which powdered rubber may eventually play a very important part.

In the first place it must be realized that with a really fine dry powder such as that under discussion, the costly mixing operation on roll mills or in an enclosed mixer, with its heavy capital charges and wasteful power consumption, can be reduced to a simple stirring together or tumbling of powders in a light, cheap machine. Even though the powder must sell at a somewhat higher price

than crepe or smoked sheet, it is certain that the total cost to the end of the mixing stage will be to the advantage of the powder.

There seems to be no question that such easily made mixtures of powders can be directly molded and vulcanized, under suitable conditions, to satisfactory products, while the margin of cost allows the mixed powders to be further milled and sheeted, calendered, or extruded for normal working up along customary lines.

It appears, therefore, that many cheap lines of rubber goods may eventually be made by direct molding of powdered mixtures. Such articles come to mind as heels, soles, tips, studs, and pads for footwear; electrical insulating sleeves, bushes, housings, supports, and covers; a variety of sports goods and toys, including golf tees, billiard cushions and cue tips, grips and handles for bats and racquets, and the like; many types of mechanical small wares such as door stops, tips or ferrules to furniture, crutches, and other movable articles, all the small washers and pads now in common use in gramophones and loud speakers for acoustic correction and insulation; horseshoes, packings and jointing rubbers, stoppers and jar rings, domestic articles such as tap washers and tap or tea-pot spouts, erasers, hand stamps, squeegees and scrapers; foot corrective supports, massage rollers, and many other articles too numerous to mention. X-ray resistant rubber, involving the mixing of 90% or more of litharge with rubber, may almost certainly be made exclusively with rubber powder as soon as its advantages in mixing are realized.

Nor will the benefits of cheap mixing be limited to small articles. The economy in mixing is greatest in the case of the heaviest loaded stocks, so that it seems probable attempts will be made to produce tire tread rubber, belting, mats, and flooring from the powder. In this connection methods may develop for streaming the powder and fillers through suitable sheeting devices, followed by continuous vulcanization, to produce new types of roughly finished but very cheap floorings which will appeal to new markets. Tiles and mats will be press molded directly from the mixed powders, and another step will be taken toward bringing the cost of rubber road blocks within practical bounds when the powder method is applied to them.

The conception of forming roughly finished sheets will, no doubt, extend to the production of new types of porous rubber and new filtering masses. It is, in fact, easy to obtain highly porous products in which the particles of rubber adhere to one another at separated points of contact instead of being compacted into solid masses. Such materials should have a useful future in extending the applications of sponge rubber. Obvious uses lie in cushioning and upholstery of all kinds, in thermal insulation for refrigerators and cold boxes and vehicles, in sound insulation and correction, in buoys and other floating articles requiring light fillings, and as a cheap form of flooring underlay.

Normal Curing Agents

It is clear that in many of the ways of applying powders vulcanization may be taken either to the soft rubber stage or to the stage of ebonite according to the requirements. Cold curing and vapor curing will apply as usual, and by applying these methods to the powder itself, finely divided vulcanized rubber can readily be obtained if at any time uses for such a derivative arrive. The Peachey process of vulcanization by means of hydrogen sulphide and sulphur dioxide is another method by which powders themselves can readily be vulcanized. The use of selenium, of sulphur containing accelerators in the absence of free sulphur, and of organic nitro- and oxy-compounds as vulcanizing agents will follow the normal procedures when applied to rubber powders, always excepting the ease of mixing.

There is nothing in rubber powders which will prevent the customary "finishing" treatment with paints, varnishes, polishes, starch, and the like. On the other hand, by judicious modifications in the anti-agglomerating constituents added to the powders, or by suitable pretreatments of the powders, it will be possible to produce them in various forms which react differently toward given finishes. In this way, granular and many other novel effects in surface appearance should be within reach.

Rubber Beach Wear

(*Continued from page* 39)

cured, moire patterned flesh rubber in small, medium, and medium large sizes. Keinert's contributions, also for figure control, in Sturdi-Flex, a perforated odorless rubber, are a one-piece foundation with very low back, uplift bra, adjustable straps, and pantie-style skirt in even sizes 32 to 44; and separate bra and girdle in the same sizes. U. S. Rubber makes pantie-style swim girdles of latex or rubber, flesh or white, in small, medium, or regular sizes.

Water Toys

Inflated beach toys change little. Ever popular are balls, water fowl, denizens of the deep, tadpoles, dodo birds, horses, surf boards, mattresses, small boats, and rings in circular, frog, oval, or duck forms.

New for 1936, however, is the Howland Swim Teacher from U. S. Rubber. This consists of two 40-inch inflated tubes joined near one end to a small inflated tube held together wider at the other end by an adjustable strap, on which the would-be swimmer rests his feet while his chest is buoyed on the small center tube. With this device comes a waterproof illustrated instruction folder. The Swim Teacher appears in red, white, and blue.

New Belt Splicing Method

(*Continued from page* 36)

eight-inch belting, the torch is used for approximately five minutes.

The action of the heat is to draw the cement into the fabric, thus creating a firm bond. Immediately on completion of the heating the spliced section should be placed in a press, or some other means used to apply an even pressure for a few minutes, until the belt is reasonably cool. For eight-inch belting, about five minutes in the press is sufficient. Water can then be used to hasten the cooling.

For extremely large belting, the two ends of the splice should be stitched in order to insure that the ends remain in place. This is not necessary, however, on the lighter or smaller sizes.

On completion of this work, the belt is ready for use. This method has proved to be far superior to other methods as the time involved in making the repair is an important item. Large operations have been held up through belt breakage, and repairs by other methods such as the cold rubber cement method often require as much as eight hours to dry. A belt repair may be made in less than one hour, using the method outlined above.

Synthetic Rubber

Joseph Rossman, Ph.D.

THE following abstracts of United States patents continue the enlightening article on synthetic rubber from our June issue.

47. Holt and Steimmig, 1,294,662, Feb. 18, 1919. Example 1: add to isoprene 2% of its weight of old oxidized caoutchouc and polymerize by heating a long time at 100° C.

Example 2: mix isoprene with 3% of oxidized caoutchouc (prepared by treating caoutchouc with ozone) and polymerize by maintaining the mixture for a considerable time at from 60 to 100° C.

Example 3: mix 100 parts by weight of isoprene with two to three parts by weight of the product obtainable by acting on a terpene hydrocarbon with ozone; then polymerize by heating for some time at 100° C.

Example 4: mix 100 parts by weight of 2,3-dimethyl-1,3-butadiene with three parts by weight of 2,3-dimethyl-1,3-butadiene ozonide (obtainable from 2,3-dimethyl-1,3-butadiene and ozone) and polymerize by heating at 100° C.

48. Gottschalk, 1,323,589, Dec. 2, 1919. To change limonene into a rubber-like substance bring it into contact with metallic sodium.

49. Plauson, 1,415,468, May 9, 1922. Example 1: 100 parts of liquid butadiene are charged into a pressure vessel; then nitrogen is forced in by a high-pressure compressor up to 300 atmospheres' pressure. The vessel, hermetically closed by a valve, stands about four weeks at atmospheric temperature. By then the contents of the reaction vessel have been transformed into an almost transparent homogeneous mass which can be worked on rollers into a sheet of rubber. By increasing the pressure to 600 atmospheres, the polymerization can be effected in five to six days. The pressure must be applied slowly, and the mass must be efficiently cooled, e.g., by water.

Example 2: a pressure vessel is charged with 100 parts of isoprene cooled to the temperature of liquid ammonia, and three to five parts of liquid ammonia (NH_3) are added to fill the vessel to its neck so that no air space is left; whereupon the vessel is tightly closed. After four to six weeks' standing at room temperature (25 to 30° C.) the whole mass has become solid owing to the internal pressure. A soft elastic substance is obtained which can be excellently rolled out into a sheet giving a very high-quality rubber. Piperylene or mixture thereof with butadiene or isoprene can be polymerized to rubber in the same manner.

50. Culmer, 1,430,538, Oct. 3, 1922. To produce vulcanizable bodies bring ozone into intimate contact with a mixture of olefine and terpene hydrocarbons in the presence of heat regulated to avoid material distillation and continue the process until such hydrocarbons have been converted into solid or semi-solid elastic bodies capable of vulcanization.

51. Midgley, Jr., Hochwalt, and Thomas, 1,713,236, May 14, 1929. To polymerize dienes subject them to the action of a catalyst comprising an alloy of sodium and potassium and maintain the reaction material at a temperature above the melting point of the alloy. Such polymerization may be effected in stages by suitable selection of conditions or catalysts. If, for example, isoprene is treated with the metal catalyst, there is obtained, even in an hour or two, a conversion into a white plastic gummy body having fairly well-defined properties. This body may then be separated from the reaction mixture and dissolved in a suitable solvent, as benzol, and subjected to further polymerization in the presence of other catalysts, as sulphuric acid or one of the chloride catalysts, such as chlorides of aluminum, tin, zinc, iron, etc., which causes further conversion into a body resembling more closely in properties the rubber-like bodies obtainable from vegetable sources.

52. Staudinger and Bruson, 1,720,929, July 16, 1929. A method of treating unsaturated hydrocarbons of a group consisting of isoprene and indene comprises subjecting them to heat in the presence of tin chloride.

Example: 100 parts of cyclopentadiene diluted with an indifferent solvent, as chloroform, are treated in the cold with a solution of one part tin tetrachloride dissolved in ten parts of chloroform. The chemical addition and polymerization are made evident by heat evolution and a deep red color. Upon adding excess alcohol, a white rubbery mass is precipitated, the tin tetrachloride having split off and combined with the alcohol to form a soluble compound which therefore does not contaminate the rubbery substance. This substance is unsaturated to the extent of one-half as much as the original cyclopentadiene.

53. Dinsmore, 1,732,795, Oct. 22, 1929. To produce synthetic rubber treat an aqueous suspension of a butadiene hydrocarbon adapted to be polymerized to produce artificial rubber with an ammonium salt of oleic acid and a protein; allow the materials to stand at a temperature of from 50 to 70° C. until polymerization occurs.

Example 1: to 30 cubic centimeters of isoprene add in small quantities 30 cubic centimeters of water containing approximately ten drops of the emulsifying agent, as oleic acid, and sufficient ammonia to form a soap. Agitate these materials vigorously a while; then add 15 cubic centimeters of a 2% solution of casein in small quantities from time to time and keep the mixture cool by frequent immersion into ice water. After all the casein has been added, the caoutchouc is sealed and placed into an oven maintained at substantially 50° C. After two months in the oven the isoprene begins to thicken, and at the end of six months will have become quite viscous. When the viscous substance is treated with acetone, a rubber-like mass separates out, which may be milled and vulcanized by sulphur and a suitable accelerator.

Example 2: take 30 cubic centimeters of the hydrocarbon and emulsify it in 30 cubic centimeters of water containing ten drops of oleic acid neutralized with potassium hydroxide. To this solution add 15 cubic centimeters of 2% solution of egg albumin. Seal the mixture in a tube and maintain it at a temperature of about 50 to 70° C. for six months. The material may then be removed, coagulated with alcohol, and dried in a vacuum.

The product obtained is tough, elastic, and may be cured by sulphur and a suitable accelerator in a manner similar to that employed to cure the natural product.

54. Lecher and Koch, 1,789,873, Jan. 20, 1931. Example 1: 50 parts of isoprene are emulsified in 100 parts of an aqueous solution of sodium oleate of 10% strength while being shaken or stirred. The emulsion thus obtained is pressed through plates of sintered glass; whereby the emulsified hydrocarbon particles become very finely dispersed. Polymerization is then caused by heating the homogenized emulsion to about 60° C. while being shaken. After a short time a latex-like emulsion has formed, yielding a rubber-like mass by coagulation according to any desired method.

Example 2: 60 parts of butadiene-1,3, 100 parts of an aqueous solution of sodium oleate of 10% strength, and two parts 1/1 n. caustic soda lye are emulsified in a closed vessel by shaking. The unstable, not uniform emulsion thus obtainable is then homogenized in a homogenizer. Polymerization of the homogenized and stable emulsion thus obtained is performed by heating it without movement to about 60° C. for about two days. A latex-like cream thus results in a quantitative yield from which a coagulate may be produced, for instance, by acidifying.

Example 3: 50 parts of butadiene-1,3, 50 parts of benzene, two parts of 1/1 n. caustic soda lye, and 200 parts of an aqueous solution of sodium stearate of 5% strength are emulsified in a closed vessel while being shaken and gently heated. The emulsion is homogenized in a homogenizer, and polymerization is caused by heating the emulsion to 60° C. for about three days. From the latex-like cream thus obtained the benzene is removed after coagulation by distillation or extraction. The yield of polymerizate is considerably higher than that obtainable from the same, but not homogenized emulsion.

Example 4: a mixture of 50 parts of butadiene-1,3 and 30 parts of 2,3-dimethylbutadiene-1,3 are emulsified in 150 parts of an aqueous solution of sodium oleate of 10% strength and four parts of 1/1 n. caustic soda lye according to Example 2, homogenized, and polymerized. A rubber-like polymerizate is thus obtained in a quantitative yield.

55. Heuck and Enderlein, 1,809,445, June 9, 1931. Example 1: to prepare polymerization products of butadiene a pressure autoclave of 150 liters' capacity is paper lined, and 50 kilograms of the butadiene are polymerized therein in the usual manner by heating three days to about 50° C. with the addition of 0.5-kilogram of sodium as a catalyst. After the reaction has ended, the polymerization product may be easily removed from the autoclave. The adherent paper may be readily removed by soaking the product with water before or during treatment on the rollers.

Example 2: 100 kilograms of butadiene and two kilograms of dimethyl-ether are filled into a revolving autoclave lined with Wood's alloy and thereafter provided with a coating of a nitrocellulose lacquer or gelatin. Polymerization is effected, after the addition of one kilogram of sodium in the form of wire, by heating to from 50 to 60° C. After polymerization, the alloy is fused and withdrawn. The polymerization product can be easily removed from the autoclave, which must be given a fresh lining with the alloy and coating before further use.

Example 3: an autoclave of 30 liters' capacity is lined with bitumen, and the lining coated with water glass solution. After drying, the autoclave is filled with 15 liters of butadiene polymerized at from 50 to 60° C. with addition of 100 grams of sodium. After polymerization, the bitumen is melted. The polymerization product can be removed from the autoclave without difficulty. Depending on the purpose for which it is to be used, the bitumen may remain with the polymerization product, or it must be separated therefrom.

56. Tochtermann and Heuck, 1,814,420, July 4, 1931. An emulsion of five parts of aldol-alpha-naphthylamine in 100 parts of water is introduced into an emulsion obtained by polymerization of an emulsion prepared from 200 parts of isoprene, 18 parts of olein or stearic acid, 17.5 parts of a 10% solution of ammonia, and 340 parts of water. A plastic and elastic product of great stability is obtained after coagulation.

The first-mentioned emulsion is prepared by introducing an alcoholic solution of aldol-alpha-naphthylamine, prepared hot, into water. An emulsion of the preserving agent having a good stability may also be prepared in the cold by stirring a solution of one part of aldol-alpha-naphthylamine into five parts of ethyl lactate with 15 parts of water. It is advantageous to add agents which reduce the surface tension, as soaps, saponines, aliphatic, hydroaromatic or aromatic sulphonic acids, for example alkylated naphtholic sulphonic acids and/or suitable protective colloids as glue, agar-agar, gelatin amino acids, albumines, methyl or alkyl cellulose, etc., to the emulsion of the preserving agent.

57. Krauch and Muller-Cunradi, 1,823,495, Sept. 15, 1931. A fraction of a product of the destructive hydrogenation of mineral oil, boiling up to about 100° C., which contains hydrocarbons with several double bonds in the molecule (as a rule recognized by the fact that on shaking with concentrated sulphuric acid the color of the mixture becomes considerably darkened) and is obtained by fractional distillation, is treated at room temperature for several hours with an excess of aqueous sulphurous acid while vigorously stirred or shaken. The solid products settling after that time are separated and, if necessary, washed. When these products are heated, or treated with aqueous solutions of alkalis, hydrocarbons are obtained which can be converted into substances of high molecular weight, of the nature of caoutchouc, by treating them with suitable polymerizing agents, such as finely divided metallic sodium.

58. Tschunkur and Bock, 1,826,846, Oct. 13, 1931. About 75 parts of butadiene and about 75 parts of 1,3-dimethylbutadiene are emulsified with 150 parts of water and 15 parts of sodium stearate and polymerized at about 70° C. for about one week. The polymerizates thus obtainable are mixed with three parts of sulphur, 15 parts of zinc oxide, two parts of tar, two parts of stearic acid, 50% of carbon black (calculated upon the mixed polymerizate), and one part of diphenylguanidine by rolling, and the mixture is vulcanized by heating for about 40 to 50 minutes to a temperature of about 135 to 140° C. In this manner, or according to similar vulcanization methods, vulcanizates are obtainable possessing a tensile strength of about 180 to 250 kilograms per square centimeter at a stretch of about 600 to 800%; whereas the corresponding figures in the absence of carbon black will be 30 to 50 kilograms per square centimeter and 300 to 500%.

Vulcanizates of similar properties are obtainable when replacing the 1,3-dimethylbutadiene by 2,3-dimethylbutadiene or by causing polymerization to take place in the presence of water and another suitable emulsifying agent and vulcanizing as described above, or by starting with the corresponding isoprene-dimethylbutadiene mixture or with butadiene-isoprene-dimethylbuta-

diene mixtures of different composition and otherwise working in the same manner.

59. Ebert, Fries, and Reppe, 1,827,285, Oct. 13, 1931. In the polymerization of butadiene with sodium, ether is allowed to flow over the latter, butadiene is continuously introduced into the ether before it leaves the sodium, and the rate of flow of the ether is adjusted to be sufficiently slow to effect the polymerization.

60. Calcott, Downing, and Powers, 1,829,502, Oct. 27, 1931. The process of preparing rubber from acetylene consists in polymerizing the acetylene from divinylacetylene. To 100 parts of divinylacetylene are added 200 parts of water, two parts of naphthenic acid sodium salts, and one part of gelatin. The mixture is agitated violently until microscopic examination reveals the average particle size is one micron and that disproportionally large or small particles are chiefly absent. With this emulsion is then mixed one part of guayule resin in the form of an aqueous suspension. The mixture is allowed to stand seven days at room temperature (25° C.) to polymerize, and then is added one part of *Hevea* latex, thoroughly incorporated by gentle agitation. Two-tenths of a part of hydroquinone in the form of an aqueous solution are added. The mixture is then coagulated by the addition of sufficient 2% acetic acid to change the pH of the solution to approximately 4. The coagulum thus obtained is freed from water by milling and is ready for use as raw rubber. The finished product may be treated in the same general manner as raw natural rubber. It may be milled, the usual chemicals as zinc oxide, sulphur, accelerators, carbon black, softeners, antioxidants, etc., incorporated. It can be cured, or vulcanized, by heat treatment applied in a manner similar to that used in curing natural rubber.

61. Ebert and Fries, 1,832,450, Nov. 17, 1931. Four thousand parts of butadiene are polymerized in a rotary autoclave by the agency of 12 parts of sodium dust, with an addition of 40 parts of dioxan. The reaction sets in very rapidly at about 60° C. and is completed in twenty-four hours. A polymerization product results.

62. Woodruff, 1,835,365, Dec. 8, 1931. To make a rubber-like coagulum mix with latex a quantity of oil approximately equal in weight to the rubber in the latex and add to the mixture a quantity of a 40% solution of formaldehyde equivalent to about 2% of the combined weights of the oil and the rubber in the mixture.

63. Giron, 1,835,998, Dec. 8, 1931. A process of converting hydrocarbons of petroleum oil into a product containing about 5% of fatty acids, suitable for manufacturing high-grade rubbery material, comprises selecting a heavy viscous substantially uncracked hydrocarbon distillate, which would distill at atmospheric pressure between about 280 and about 370° C., and subsequently chemically treating the hydrocarbon, by contact thereof with air together with exposure to direct sunshine, at about atmospheric temperature, and mixed with at least the aqueous portion of the fermentation products of cellulosic and sugary vegetable material fermented in a wet condition.

64. Schirmacher and Zutphen, 1,838,234, Dec. 29, 1931. To polymerize hydrocarbons of the butadiene series treat them with sodium hydride.

Example: 2,000 parts of liquefied butadiene are placed into an iron pressure vessel in which the mass can be agitated; then 20 parts of sodium hydride are added. The mass is left alone for a considerable time at a temperature of from about 30 to 50° C. (if necessary while stirred) until the whole or the greater part of the butadiene has disappeared. The mass is worked up in such a manner that after elimination of the butadiene which may sometimes still be present the caoutchouc is either separated from the sodium hydride by a solvent, or the sodium hydride is destroyed by adding alcohol.

65. Lecher and Koch, 1,851,104, Mar. 29, 1932. The process comprises emulsifying a butadiene hydrocarbon in water in the presence of both an emulsifying agent soluble in water and one soluble in the butadiene hydrocarbon and then polymerizing the butadiene hydrocarbon.

Example: 75 parts of an aqueous solution of sodium oleate of 10% strength and a solution of 2.5 parts of magnesium oleate in 50 parts of butadiene-1,3 are emulsified by shaking or stirring the mixture in a closed vessel. Polymerization is then performed by heating the emulsion to 60° C. for about six days. The resulting latex-like mass yields a rubber-like coagulate by acidifying. Similar results will be obtained when the butadiene-1,3 is replaced by 50 parts of isoprene.

66. Gerke, 1,854,186, Apr. 19, 1932. To make a synthetic rubber polymer polymerize erythrene in the presence of barium peroxide and benzoic anhydride and remove the unpolymerized erythrene.

67. Patrick, 1,854,423, Apr. 19, 1932. To produce a vulcanized compound admix the product resulting from the reaction of polysulphides and ethylene dichloride with rubber and heat the mixture under vulcanizing conditions.

68. Mnookin, 1,854,480, Apr. 19, 1932. To treat a mixture of the reaction products of polysulphides and olefines of the formula C_nH_{2n} and sulphur, heat the mixture to at least 212° F. long enough to stabilize it and render it permanently rubber-like.

69. Tschunkur and Bock, 1,859,686, May 24, 1932. Example 1: 150 kilograms of butadiene are polymerized in an autoclave and in a nitrogen atmosphere in the presence of 0.75-kilogram of diisobutylether and 0.25-kilogram of sodium wire at normal temperature. After three to four days a very nervous, rubber-like mass is obtained in a quantitative yield.

Example 2: 150 kilograms of butadiene are polymerized in an autoclave and in a butadiene atmosphere in the presence of 0.5-kilogram of diamylether and 0.3-kilogram of sodium metal. A nervous and elastic polymerizate, similar to that of Example 1, is thus obtained.

Example 3: 100 kilograms of isoprene together with 1.5 kilograms of diethylether and 0.5-kilogram of sodium wire are allowed to stand in a suitable container until polymerization is finished. In this case also a nervous and elastic rubber-like mass results.

70. Luther and Heuck, 1,860,681, May 31, 1932. Eighteen parts of olein are dissolved in 200 parts of isoprene, and the solution is emulsified by shaking in 350 parts of an 0.5% aqueous solution of ammonia to which 0.5% of glue is added as a protective colloid. The hydrogen-ion concentration of the emulsion amounts to 8.9. It is a stable emulsion, and by adding five parts of 30% hydrogen peroxide and heating for two days at 50° C. a product, containing the polymerization product in dispersion in the manner that rubber is contained in latex, is obtained. Thirty parts of a 10% aqueous sodium hydrosulphite solution are then added. The hydrogen peroxide still present is thus destroyed, and by precipitation in the usual manner a white polymerization product is obtained.

By employing 50 parts of a 1.5% solution of phenol or aniline in water instead of the sodium hydrosulphite solution, a stable polymerization product is similarly obtained, which, however, is darker in color.

(*To be continued*)

Editorials

A Perpetuated Service

Henry C. Pearson, 1858-1936

THE almost innumerable original contributions that sprung from the rare talents and purposeful ambitions of Henry Clemens Pearson have been of immeasurable value to the progress of the rubber industry, not alone in the United States, but throughout the world. More than 50 years of his lifetime were given to the most energetic types of tireless mental and physical activity that produced creative works, which, at one and the same time, both added directly to the ever-growing mass of knowledge and intelligence regarding rubber from its crude sources to its finished forms, and stimulated others to do likewise.

In mid-October 47 years ago appeared the initial issue of the first periodical for the dissemination of information concerning rubber ever to be published in the United States. INDIA RUBBER WORLD was founded by Henry C. Pearson for the exchange of ideas regarding rubber practice and its technology. The intrepidity of this undertaking at that time can best be appreciated when one reflects the relative limitations of the knowledge then possessed by those in the industry and the guarded secrecy with which it was held. Mr. Pearson realized that it would be necessary to rely very largely on his own resourcefulness to supply sound and beneficial information that would command the interest, the respect, and the eventual cooperation of those in the trade. That this work was done well and unstintingly is attested by the generous appreciation that followed and the world-wide honor and respect that centered upon him as a most thoroughly informed rubber expert throughout the latter half of his lifetime.

Among his many books are those that pioneered the presentation of practical and technical information regarding varied phases of the rubber industry. These, like INDIA RUBBER WORLD, have served through the years as textbooks for the educational aid of each young generation upon entering the industry and as constantly sought references for those generations more experienced.

The records of Mr. Pearson's energy and initiative have brought much gratification to him during an active life and will stand as monuments into posterity now that he has passed beyond.

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meetings

New York Group

THE third annual picnic outing of the New York Group, Rubber Division, A. C. S., June 13, at Alps Castle, Alps Road, Preakness, N. J., was a conspicuous success in spite of inclement weather. The ambitious program of sports organized by Chairman W. C. Lingvall included boochie, tennis, horseshoe, and soft ball contests, some one or more of which engaged the competitive attention of practically every one of the 330 members and guests in attendance.

The soft ball final was played in the rain by the well-trained Overman Tire Co. and du Pont teams, which resulted in victory for the former. The INDIA RUBBER WORLD loving cup was therefore transferred from the possession of du Pont, last year's winner, to the Overman club.

The three boxing bouts planned for the out-of-doors ring had to be held indoors because of the rain. These bouts were called by W. W. ("Bill") Higgins, of United Carbon, who arranged for the card, which was of a fast entertaining nature.

During the dinner, which began at 4.30 p.m., entertainment was furnished by the Alps orchestra and vocalists. Numerous prizes were distributed then to the winners of all contests as well as to the holders of lucky ticket numbers. The fine array of prizes was made possible by the donations of the following organizations: Binney & Smith Co., Container Co., E. I. du Pont de Nemours & Co., Inc., Farrel-Birmingham Co., Inc., Flintkote Co., General Atlas Carbon Co., INDIA RUBBER WORLD, Naugatuck Chemical, New Jersey Zinc Co., *Rubber Age*, Seamless Rubber Co., Southeastern Clay Co., Stamford Rubber Supply Co., United Carbon Co., R. T. Vanderbilt Co., Vansul, Inc.

The interest that has so rapidly centered about the New York Group outing is evidenced by the growth in attendance which was 86 at Semler's Midland Park, Grant City, Staten Island, N. Y., June 30, 1934; 200 at Alps Castle, June 15, 1935; and 330 this year.

Boston Group

THE spring meeting of the Boston Group, Rubber Division, A. C. S., was held at Hotel Kenmore, Boston, Mass., May 27. Group members and guests attending numbered 105.

Following the dinner Chairman Blake introduced the speaker of the evening, H. F. Wakefield, research chemist, Bakelite Corp., Bloomfield, N. J., who read a paper on phenolic resins in industry. The first attempt to place synthetic phenolic resins industrially was the introduction of Bakelite to molders of hard rubber. The molding equipment and curing temperatures for hard rubber work were unsuited for phenolic resin molding. Ultimately the new material was well and finally started with custom molders. Its first major struggle for a share in a common market was for the manufacture of gasoline engine distributers. For this purpose the inferior resistance of phenolic resins to carbonization under arc or spark gave rise to the first composite structure of rubber and resin. The second important struggle for Bakelite resulted in establishing the material in the telephone industry for mouthpieces and receivers. The third large-scale competition occurred in the radio market, no longer important, in which the phenolic laminated structure for radio panels, etc., captured the entire field. One of the contests now on is in the abrasive field where the market is divided between rubber and resin bonding for grinding wheels. As against phenolic resins, rubber holds control for flooring, bowling balls, battery jars, automobile steering wheels, and toilet seats. Resins can be bonded with either hard or soft rubber as in distributer heads, casters, etc. In laminated construction hard or soft rubber is sandwiched with resin-impregnated cotton fabric and finds application in friction brakes.

The hard rubber field has not been seriously displaced by phenolic resins, and in the latter field the trend is to make a larger number of compounds in

fabric form. In closing the speaker called attention to a new product of rubbery consistency formed by chemical reactions typical of resins. This product is a doughy mass that can be milled and calendered. Samples of this material in various brilliant colors were exhibited, skim coated and cured on sheeting adapted for bath curtains and raincoat wear.

Following the paper an exceedingly mystifying entertainment was given by Walter Grote, of the United Carbon Co., whose marvelous skill at card tricks is well known and admired whenever displayed. On this occasion he added still further to his reputation by performing with signal success one of the astounding tricks of the late Houdini, the magician. This was the feat of swallowing separately a couple of papers of cambric needles, a length of cotton thread, and a glass of water and thereupon withdrawing the thread from his mouth with the needles threaded upon it, spaced at intervals.

Akron Group

THE annual spring outing of the Akron Group, Rubber Division, A. C. S., was held June 26 at Silver Lake Country Club. Golf, tennis, fishing, and other sports were provided. Prizes were awarded winners of the various contests. Dinner was served, and the evening spent in good fellowship.

Fall Meeting

THE Rubber Division will meet with the American Chemical Society at its next meeting at Pittsburgh, Pa., the week of September 7. Information regarding headquarters, programs, etc., will be published in future News Editions of *Industrial and Engineering Chemistry*, and the rubber journals.

C. W. Christensen, secretary-treasurer of the Rubber Division, also advises the members that the deadline for receiving papers to appear on this program is July 18. If you plan to give a paper on the program, please make note that there has been an important change made in the handling of the papers. All rubber papers for the Pittsburgh meeting are to be forwarded to the chairman of the papers committee, Ira Williams, P. O Box 525, Wilmington, Del. He will appreciate having information regarding your paper as soon as possible so that he may make definite reservations as to the number of sessions needed on the program. Also, please remember that he must receive four copies of each paper submitted for the meeting.

Rhode Island Rubber Club

THE annual golf tournament meeting of the Rhode Island Rubber Club was held the afternoon and evening of June 4 at the Metacomet Golf Club, East Providence, R. I. Play began about 2 o'clock, in which more than 80 members and guests participated. The total attendance was 133.

Following the steak dinner many contest and door prizes were distributed. Winners of the first position prizes in each class of play follow: Gross for guests, Chas. Round, Brown University; Harold Simmons, Industrial Paper & Cordage Co.; and E. M. Rupert, University of Alabama. Gross for members, John Marshall, Collyer Insulated Wire Co.; Ray Newell, Respro, Inc.; and James Mason, Quabaug Rubber Co. Low net, H. E. Thompson, Anaconda Wire & Cable Co.; Charles Haynes, Binney & Smith Co.; and Francis Jacoby, Francis Jacoby & Sons. Blind bogey, L. D. Walker, Collyer Insulated Wire; Geo. Wilson, Geo. Wilson Co.; and Mr. McLain, Davol Rubber Co.

Since this was the club's annual meeting, the nominating committee announced its recommendations for officers for the coming year. These were unanimously elected as follows: F. E. Rupert, Anaconda Wire, president; Sam Tinsley, Coated Fabrics Co., secretary-treasurer; executive board: D. C. Scott, Jr., Henry L. Scott Co.; E. L. Hanna, Davol; N. G. Madge, United States Rubber Products, Inc.; Gladding Price, R. T. Vanderbilt Co.; Charles Biglow, American Wringer Co.; Arthur Carr, Carr Mfg. Co.; Alfred B. Lingley, Phillips-Baker Rubber Co.; and Lawrence D. Walker, ex-president of the club, Collyer Insulated Wire.

R. P. Dinsmore, assistant factory manager, Goodyear Tire & Rubber Co., Akron, O., addressed the meeting on "The Rubber Business at Home and Abroad." Foreign countries, especially England, were credited with the inception of a majority of our prominent rubber products and processes, but the refinement and commercialization of them in America has built here an industry that exceeds 70% of that of the entire world. An important phase of Mr. Dinsmore's message consisted of revealing the disastrous competition and profit effects that the frequent and extreme fluctuations of crude rubber prices have presented to every business concern in the industry during the past twenty-five years.

The prizes distributed at this meeting were the result of contributions by the following companies: American Zinc Sales Co., Anaconda Sales Co., Ansbacher-Siegle Corp., Binney & Smith, Carr Mfg., E. I. du Pont de Nemours & Co., Inc., Eagle Picher Sales Co., Farrel-Birmingham Co., General Atlas Carbon Co., Halowax Corp., Industrial Paper & Cordage, Monsanto Chemical Co., Moore & Munger, H. Muehlstein & Co., Naugatuck Chemical, New Jersey Zinc Co., Pequanoc Rubber Co., Philadelphia Rubber Works Co., Southeastern Clay Co., Stamford Rubber Supply Co., Wm. R. Thropp & Sons Co., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt, L. G. Whittemore, Xylos Rubber Co., and Wishnick-Tumpeer, Inc.

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A. S. T. M. Meeting

THE thirty-ninth annual meeting of the American Society for Testing Materials was held at Atlantic City, N. J., from June 29 to July 2, 1936. The program was extremely long and varied, requiring 19 sessions for completion.

Report of Committee D-11 on Rubber Products. H. A. Depew, Chairman. Submits tentative revisions of the standard methods of chemical analysis of rubber products. Proposes revisions in the tentative specifications and tests for friction tape, in the test for compression set of vulcanized rubber, methods of tension testing, test for adhesion, and for accelerated aging of vulcanized rubber, and test for adhesion of vulcanized rubber to metal. Recommends adoption as standard of the tentative methods of testing rubber belting and of the methods of test for rubber hose. Reports progress in the program for development of certified standard samples. Discusses activities of various subcommittees, including the reorganization of the subcommittee on insulated wire and cable and the work of the subcommittee on life tests which has in preparation a proposed method for air bomb tests for publication as information.

Symposium on the Limitations of Laboratory and Service Tests in Evaluating Rubber Products

The series of papers comprising this symposium deals with five important classes of rubber products and shows the relative importance of: (1) laboratory tests in which pieces of the products are tested, (2) laboratory performance tests in which the product is tested as a whole, (3) service tests, and (4) the good name and reputation of the manufacturer. The following synopses outline the symposium papers.

Methods of Evaluating Tire Performance. By even the most detailed examination and tests on sections of a tire, only a vague estimate of its probable road performance can be reached. If by such examination specific and outstanding weaknesses, either in quality of material or features of design and workmanship, are identified, poor road performance can usually be postulated. Failure to uncover such weaknesses is by no means a guarantee of good and well-balanced durability in service. However a preliminary analysis of this sort can usually be relied upon to classify a product into the general groups of first, second, and third and lower grades. By laboratory tests on mounted tires specific types of failure can be developed with an accuracy determined largely by the constructional uniformity of the tire or group of tires. For those types of failure feasible to produce a general accuracy of at least 10% can be expected. Six such tests, some rotative and some static, are found useful in evaluating particular items of tire performance. But certain types of structural breakdown are encountered in road service which are not possible, or at least feasible, to develop in the laboratory. For these, and particularly for an accurate picture of the rate and type of tread wear, recourse must be had to road or fleet tests. R. D. Evans, Goodyear Tire & Rubber Co.

The Testing of Rubber Footwear. Since purchasers of rubber footwear, with few exceptions, do not test their goods or have standard specifications, this paper considers testing from the point of view of the manufacturer. It is pointed out that the many changes which have taken place in footwear manufacture compelled the producers to test the results of their changes as well as to note the value of the development work. A description of the laboratory tests used and a discussion of the relation of service testing to laboratory testing are given. It is concluded that neither method of testing is a substitute, but that they are complementary to each other and that after results of each method are obtained laboratory tests offer a high degree of confidence in the prediction of actual wear. W. E. Glancy, Hood Rubber Co., Inc.

Significance of Laboratory Tests in Evaluating Automotive Rubber Parts. This paper attempts to show the value of various types of physical tests for evaluating automotive parts such as motor mountings, bumpers, shackles, hose, etc. There are three types of testing methods in use at the present time. (1) Laboratory tests on samples of rubber cut from the parts. These include tensile strength, modulus, elongation, hardness, compression set, abrasion, and resilience. (2) Laboratory tests on the parts as a whole where one particular service condition is chosen and that test made under laboratory conditions. (3) Service tests where the parts are installed in the automobile and subjected to regular road or service tests. This paper divides these tests into two groups: those used in the design or choice of the right quality of rubber for the particular part; and those tests used as control tests to check the uniformity of production. Reference is made to several representative parts since the field is too large to cover each item in use today. J. J. Allen, Firestone Tire & Rubber Co.

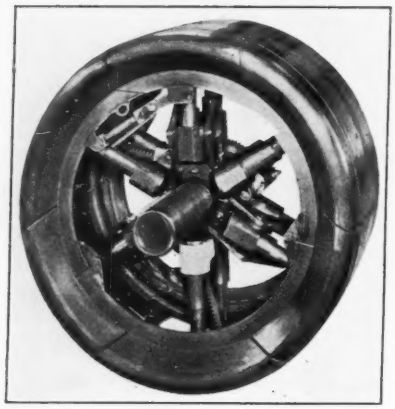
The Relation between Laboratory Tests and Service Life of Rubber Hose and Belting. Brief consideration is given the laboratory tests usually employed in evaluating rubber hose and belting, emphasizing the characteristics actually measured by the tests and the significance of these characteristics in actual service performance. Some of the variables encountered in service and the degree to which these can be taken into account in the laboratory tests are discussed. Both tests of the usual physical properties and of the performance type are covered, and laboratory test data and field service reports are given to illustrate the various points discussed. The paper supports the opinion that it is possible to evaluate the probable life of rubber hose and belting in many kinds of service by the use of properly designed laboratory tests although, in general, such evaluation requires the use of tests of the performance type. Since these tests are for the most part comparative, it is usually essential to have a background of both laboratory tests and service records on a product to predict in the laboratory the probable service of a given article or newly developed construction. W. L. Smith and Arthur W. Carpenter, B. F. Goodrich Co.

The Testing of Rubber Insulated Wires and Cables. A significant feature in testing rubber insulation on wires and cables has been the trend toward performance specifications for purchasing rather than to specify to composition desired. This paper gives the results of an extensive survey to determine present practices and trends in testing rubber insulation on cables. Tests discussed include chemical analysis, mechanical (tensile strength, elongation, and set) aging, compression cutting, tear resistance, ozone-corona, water absorption, and electrical tests. Cable manufacturers indicate their belief that several carefully chosen tests which closely simulate service conditions offer a good measuring-stick for predicting the life of a rubber compound under ordinary conditions. Performance tests should be designed particularly for the service for which the cable is intended and not considered for the rubber alone. Discussed also is the need of improvement and extension of performance tests to provide better quality control and further work in interpreting aging tests and correlating them with service life. More adequate tests for moisture absorption and resistance to sunlight and ozone were requested, the survey shows. Dean Harvey, Westinghouse Electric & Mfg. Co.

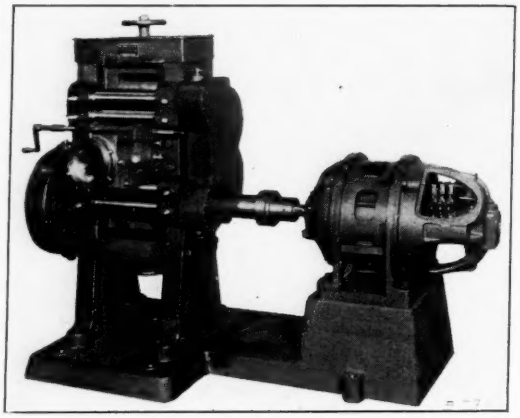
O. N. V.

O. N. V. is practically an all-purpose accelerator. Chemically it is diphenyl-carbamyl-dimethyl-dithiocarbamate. It is a yellow powder; sp. gr., 1.19; m. p., 183 to 185° C. (361.4 to 365° F.). It is soluble in most organic solvents and insoluble in water. It is stable, non-toxic, and non-blooming. O. N. V. stocks have a distinct safety zone in processing, but cure very rapidly at and above 250° F.

New Machines and Appliances



National Tire Drum—Model 12A



Robertson Model G Lead Sheath Stripping Machine

Tire Building Drum

A COLLAPSIBLE, six-section, power operated tire building drum is here pictured. It is constructed for undercut high crown profiles and used for building heavy-duty dual bead tires.

The unique mechanical design of this new drum arranges for the sections to be collapsed and withdrawn from the tire by power rotation of the building machine. The loose rings are removed from the bore of the end flanges, after which action the collapsing operation can proceed. In this the three key sections are first drawn from their positions in the drum periphery to a new shorter radius position near the hub; then the remaining sections are drawn into a lower position, nesting immediately above the key sections.

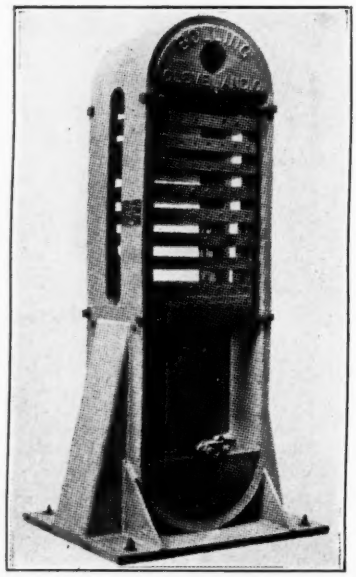
Practically all undercut drum profiles are accommodated by modified designs of this chuck, one of which is shown in the accompanying illustration. When using this design, extremely high crowns are quickly stripped from the largest tires with a minimum of effort on the part of the tire builder.

To gain the strength and high-duty requirements of a drum for this service, alloy steel hub members and chuck parts are used in conjunction with the best grade of bronze and heat-treated steel for slide rods, screws, nuts, and bushings. National Rubber Machinery Co., Akron, O.

New Molding Press

THE high-pressures and precise dimensional requirements for properly molding both rubber and plastic articles by present-day practice has necessitated an evolutionary step in the design of platen vulcanizers to reduce or eliminate deflection that results from the unequal stretch of tension rods, according to the experience of Stewart Bolling & Co., Inc., 3190 E. 65th St., Cleveland, O.

This company has, therefore, developed a type of press which has been supplied in sizes ranging from 500 to 4,000 tons' pressure. It differs from the conventional four-corner post tension rod design by substituting a link shaped steel slab forging which forms a complete, but single piece housing for the ram pot, platens, and press head, thus assuring equalization of strain and increasing the factor of safety with much lighter and neater construction. In addition a new system of packing is provided which materially reduces the maintenance cost despite the higher hydraulic pressure possibilities.



Bolling Heavy-Duty Press

Lead Sheath Stripper

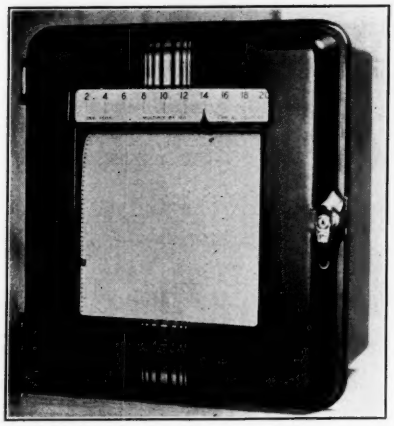
THE improved lead sheath stripping machine shown in the illustration is now supplied with all bearings bronzed bushed. The gears on both sides of the machine are fully enclosed in oil-tight cases, and the bearings are equipped with "Alemite" fittings for positive pressure lubrication.

The adjustable guide and splitting head has been featured before, but is still the last word as it is quickly adjustable to all sizes of round or oval lead sheath within the range of the machine, which in the present instance is from ¼-inch to 4 inches in diameter, inclusive. In addition to being extensively used in this country these machines have been shipped in recent years to England, France, Germany, Poland, Africa, and Japan. John Robertson Co., Inc., 121-137 Water St., Brooklyn, N. Y.

New Recorder

MARKING the twenty-fifth year since its makers originated the recording potentiometer pyrometer, this Micromax not only provides in one instrument all combinations of indicating, recording, signaling, and controlling, but provides these functions in ways unique to this model. Measurements are presented most conveniently; a bold scale and pointer show the condition at the moment, and a clear record on ten visible inches of strip-chart shows it for the past several hours. On controllers a second pointer shows control setting. Multi-point records may be in blue or in multi-color.

In this Micromax, control and signal contacts operate undisturbed by air currents when the door is opened—even when the chart is changed, or the pen refilled. Pen holds seven-week ink



"Silver Anniversary" Micromax Recorder

supply. An ingenious double frame makes all parts of the mechanism strikingly accessible and enables the user to replace the chart without effect on other parts of the recorder. Leeds & Northrup Co.

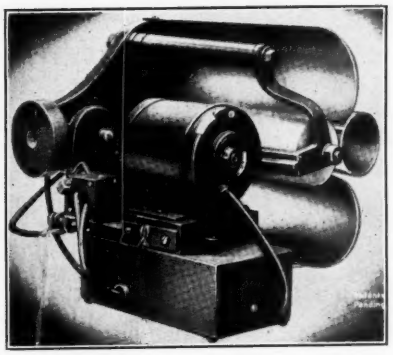
One Hand Micrometer

THIS speedy and accurate tool of simple construction designed for every type of sheet metal work is adaptable for gaging sheet rubber and coated fabrics if provided with enlarged measuring surfaces. Its special features are listed as follows: quick operation with one hand; visible readings at arm's length; direct readings in thousandths, U. S. Standard gage or millimeters; setting of dial pointer for repeat or specified readings; easily checked and adjusted for wear; immediate operation by any person. The Haines Gauge Co.

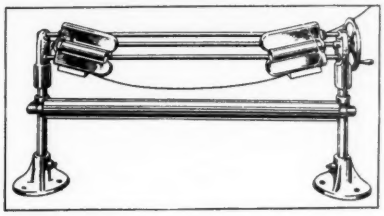
Electric Cloth Guider

A NEW type of electric cloth guider, developed by H. W. Butterworth & Sons Co., Philadelphia, Pa., is designed to give long trouble-free automatic pencil-line guiding service in whatever operations precise fabric alinement is a requirement, whether it be at calender, spreader, doubler, cutting machine, rewinding table, or inspection machine.

The guiding device consists of a casting supporting a pair of guiding devices, one at either end to contact each edge of the fabric sheet. Each device consists of two rollers, one above the other. The lower roller is rubber covered, and the upper of metal, both journaled at the end toward the supporting casting. On either side of these rollers and of the same length are metal shelves with rounded edges over which the goods passes into and emerges from the rollers. In operation the fabric edges are kept in desired alinement by the activation of these rollers. As the fabric tends to vary its position, the edge touches a switch which sensitively makes and breaks current, thus starting or stopping the small motor that drives the rolls. The motor is a 110-125-volt,



Fabric Electric Guiding Head



Guiding Heads Assembled on Cast-Iron Support

50-60-cycle A.C. type, which operates directly from a lighting circuit. It is constructed without brushes or armature winding and will stand in a stalled position 30 hours without damage or arcing. It is also so tightly enclosed as to permit operation while submerged in water. The make and break contacts are also of special design which operates in vacuum and will activate millions of times without appreciable wear or burning. This construction assures positive, sensitive, and attentionless operation covering a period of many years.

Vacuum-Tube Galvanometer

CHEMISTS and physicists in the rubber industry who have occasion to use glass electrodes or who wish to make any kind of electrical measurement such as insulation resistance which requires a sensitive galvanometer or electrometer will be interested in the recently developed vacuum-tube galvanometer—so named from the similarity of its use with that of the familiar galvanometer. The vacuum-tube instrument is a general-purpose null

Hellige Galvanometer

Bristol Model 90 Controller

indicator for use in all potentiometric measurements. It is intended for use in conjunction with any type of potentiometer, whether the potentiometer be a home-made slide wire or the most refined precision instrument, also irrespective of whether it reads in pH units or in volts. The vacuum-tube galvanometer is a compact, self-contained unit of rugged dependability, adapted for measuring systems of high resistance (e.g. 10^{10} ohms) and those easily polarized, with the same simple technique and sensitivity (0.1-millivolt) as for all ordinary systems. In actual use it is even simpler and more convenient than the ordinary galvanometer, and it cannot be easily harmed by an untrained or careless operator. Thus, in factory or field, in control laboratory or research laboratory, the instrument is universally applicable to any and all potentiometric measurements. Hellige, Inc.

Pneumatic-Type Controller

THIS new pneumatic-type controller for temperature, pressure, and liquid level has been developed to take care of the many requirements for automatic temperature and pressure control that do not warrant a chart record of the controlled temperature or pressure and, also, for applications where recording instruments already are in use. It is a small, compact instrument of simple construction, and embodies the latest developments in automatic control. The outstanding feature of this apparatus is its precision measuring element. This is of the same type as those employed in Bristol's recording instruments, where accuracy is of prime importance. The controller is equipped with a wide-range sensitivity adjustment. It can be changed from direct to reverse acting, or vice versa, by the user without additional parts. The case is moisture-, fume-, and dust-proof and is offered in two forms, for wall and for flush panel mounting. The Bristol Co.

New Goods and Specialties

Steerwheel Cushion

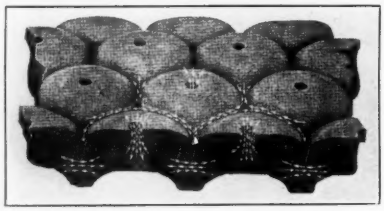
ANOTHER device designed to increase motoring safety and comfort is the Steerwheel Cushion, a "Fleskin" product shaped like a miniature tire that fits over the grip portion of the steering wheel. This covering is made from soft, resilient air-cushioned rubber. The air is impregnated into the rubber during vulcanization; thus it never needs inflation and can't be punctured. To fit the steering wheel of any car, truck, bus, or cab Steerwheel Cushion comes in three sizes: Junior, Standard, and De Luxe.

Many advantages are claimed for this product. Its surface forms a positive non-skid for the driver's hands to rest on. Vibration impulses originating in the car movement, cushioned by the air and soft rubber, reach the nerves in the form of a mild massage, which soothes the nerves and permits them to relax, increases circulation, and thus keeps the driver physically and mentally alert. The non-skid surface also gives better control of the car at high speed. This cushion, moreover, fits the hand when it is in a natural relaxed position; consequently no gripping of the wheel is necessary. The soft velvety surface protects the hands against callouses and excessive perspiration. The air cushioned rubber, furthermore, is cooler than metal in summer and warmer in winter. It does not fade to the hand. Instantly installed and long lasting, it fits the steering wheel, with no changes, alterations, or use of any tools. Steerwheel Cushion Co.

Sponge Rubber Mattress

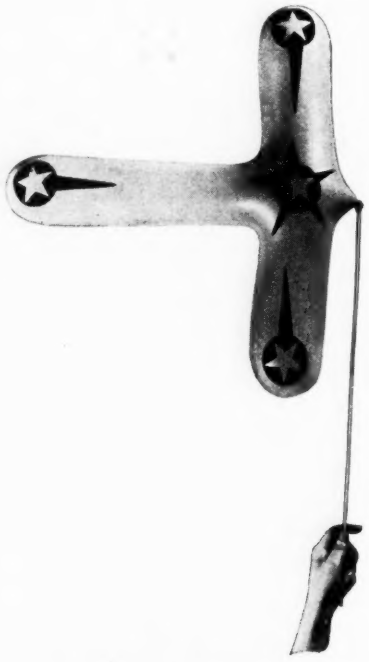
FROM France comes the Alvéolé, a new patented process for sponge rubber essentially permeable to air. This material is particularly well ventilated because it is made up of an infinite number of small communicating cells where the air circulates freely. It can be used for upholstery, automobile accessories, sporting goods, hospital supplies, cushions, mattresses, etc.

Many advantages are claimed for the alveolar mattress. It is not warm because its surface perforation aims at insuring permanent ventilation. The air circulates not only at the surface of the mattress in its cells, but throughout its entire mass, for the cells are perforated top and bottom. The least displacement of the body on the mattress not only produces a circulation of the air, but also a veritable pulsation of air through all openings. Besides, when a body is resting on the mattress, the surface is not distorted, as each part of the sponge rubber construction is independent of the others. The mattress is said to be comfortable too. Of great flexibility, it conforms exactly to the body and prevents bed sores. It does not retain dust, vermin, or microbes. It can be easily washed with warm or cold water and soap, like a sponge, and is designed to withstand disinfection either by oven or steam at a maximum of 105° or by formaline by saturation in an oven at 50°. It can be completely dipped into a tub, without injury, and then dried in the open air or in an oven.



Cross-Section of the Alvéolé

Recommended with this mattress is a removable cover of cotton jersey or supple cloth. This cover, however, must be of very open fabric permitting the air to escape freely; otherwise the air would be compressed and thus a part of the elasticity of the mattress would be lost. Where necessary, as in hospitals, the mattress must be covered by a rubberized hospital sheet. Le Coussin Alvéolé Croix de Lorraine.



Hyplane

New Inner Tube

THE Royal Master Airseal, a new tube said to hold air 2½ times longer than the ordinary tube, is announced by the United States Rubber Products, Inc., 1790 Broadway, New York, N. Y. Developed especially for use with the super-safe, long-wearing U.S. Royal Master tire, the Airseal tube is ultra-modern in design and in the many advantages which it offers.

Foremost among its qualities is its extraordinary ability to hold air. Explanation of this feature lies in the fact that the tube is treated on the inside with an exclusive new process known as Airseal. This process, technically secret, acts to reduce the seepage of air through the tube walls, a condition common to all tubes because all rubber is naturally porous. So successful is the process in checking the flow of air, engineers claim, that the tube actually holds air 2½ times longer than ordinary inner tubes.

From the motorist's viewpoint, this feature means that he will not have to stop so often to have air put in his tires. More important than this convenience is the fact that the danger of running on under-inflated tires is greatly lessened and that mileage expectancy is increased. One pound of under-inflation takes 600 miles from the life of a tire, engineers have proved.

The new tube is also safer. One reason cited for this point is that it is made 50% heavier on the rim side to eliminate tube pinching and rim chafing. A second reason, equally important, is that it is constructed with the tried and proved "U.S." air venting feature which eliminates sidewall blisters and blowouts caused by air trapped between tube and casing.

Novelty Balloon

THE newest thing in novelty toy balloons is the Hyplane, manufactured by The Oak Rubber Co. It is unique in dipped rubber goods. More than a year was spent in developing and perfecting exactly the right form so that the three parts of the balloon inflate properly and with even stress on all parts. It is manufactured from latex under the "Anode" patents. Inflated, this toy is 25 inches long from nose to tail. The wing span is 24 inches. For play, or demonstration, it is fastened to a reed stick. A few movements of the arm and wrist cause the Hyplane to go through some realistic airplane maneuvers.

Rubber Industry in America

OBITUARY

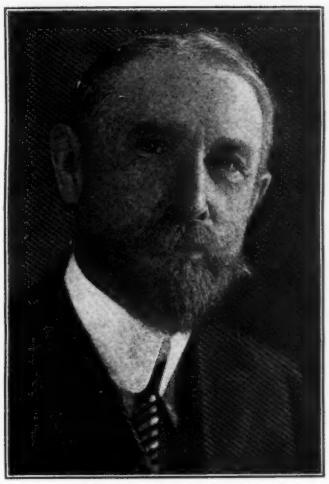
Henry Clemens Pearson

THE many friends and business acquaintances of Henry Clemens Pearson learned with sincere regret of his death, June 11, at a hospital in Pasadena, Calif. He was widely known and highly regarded by the leaders of the rubber industry on four continents as an authority on rubber. His interest in rubber dates from early manhood and engrossed his attention the remainder of his life, greatly to the advantage of its development and the progress of the industry.

He was born in Le Roy, Minn., February 13, 1858, son of Charles H. and Emily (Clemens) Pearson. In his youth Henry Pearson wrote a couple of juvenile books in emulation of his mother, a favorably known novelist.

The family removed its residence to Andover, Mass., where at the age of seventeen he began rubber work in the plant of the Tyer Rubber Co. in 1875, remaining with that concern six years. From 1881 to 1883 he was superintendent of the Hayward Rubber Co.'s plant at Bozrahville, Conn. In 1883 he was sales manager of the Brunswick Antimony Co. at Medford, Mass. During 1884-1886 he renewed acquaintance with rubber, selling machinery and supplies. He was a newspaper man and foreign correspondent in 1887-1888. In 1889 he founded India Rubber World, the first journal of the rubber trade to be established in the United States. He remained owner and editor of this magazine for thirty-seven years, when in 1926 he disposed of the publication to the Bill Brothers Publishing Corp. and retired from all active service, although he has always maintained a keen and active interest in the magazine.

Mr. Pearson was not a scientist, but gained eminence as an expert in the rubber industry by study and observation of its production in wild and plantation areas and its industrial development. To this end he was a confirmed world traveler and in his quest for knowledge of rubber visited all the major sources of crude rubber varieties in the tropics of both hemispheres. He predicted and advocated the need of plantation rubber as a dependable source for future needs. This quest for knowledge took him to Mexico, Nicaragua, Costa Rica, Panama, Colombia, British and Dutch Guiana, Venezuela, all the islands of the West Indies, Ceylon, the Federated Malay States, China, Japan, the Hawaiian Islands, and the Philippines.



H. C. Pearson in 1916

In addition to much other writing on rubber and its uses he was author of the following titles: "Crude Rubber and Compounding Ingredients," 3 editions; "What I Saw in the Tropics;" "Rubber Tires and All About Them;" "Pneumatic Tires;" "The Rubber Country of the Amazon;" "Rubber Machinery;" and "Polyglot Rubber Trade Directory."

In 1900 he acted as an expert for the United States government at the Paris Exposition. In the same year he founded the New England Rubber Club, which has since become the Rubber Manufacturers' Association, Inc. He was also secretary of the jury of awards at the St. Louis Exposition in 1904. He was much sought as a lecturer on rubber topics, speaking before scientific societies, universities, conventions, manufacturers' associations, and trade club gatherings.

On October 24, 1885, he married Adelaide Ella French, of Norway, Me., who died September, 1907.

Mr. Pearson was a Fellow of the Royal Geographical Society and held membership in the Institution of the Rubber Industry (London), American Chemical Society, and American Society for Testing Materials. He was a director of the Rubber Association of America, now known as the Rubber Manufacturers' Association, Inc.; and a Republican, Episcopalian, and Mason (K. T.). His clubs were: Lotus, Chemists' (New York), Massachusetts Automobile (Boston), Pasadena Athletic and Country, Annandale Golf (Pasadena), Los Angeles Athletic, Brentwood Country (Los Angeles), Belmont Beach (Long Beach), Edgewater (Santa Monica), and the Automobile Club of Southern California.

After leaving New York, Mr. Pearson settled in Pasadena, Calif., where he was active in civil affairs and politics.

He is survived by an adopted daughter, Miss Esther B. Pearson.

Funeral services were held in Pasadena, June 13.

William D. Lansing

WILLIAM D. LANSING, industrial chemist with E. I. du Pont de Nemours & Co., Inc., since 1929, died May 28 after a long illness. For several years Dr. Lansing was a member of the colloidal group in the fundamental research division at the experiment station, applying the ultra-centrifuge to the determination of the molecular weights of cellulose derivatives and rubber.

He was born in Marseilles, Ill., thirty-four years ago and was graduated from the University of Illinois. He was a member of the American Chemical Society, the American Physical Society, and various fraternal organizations. Surviving are his wife and a son.

John T. Maloney

JOHN T. MALONEY, 44, died June 13 of a heart attack. He was a foreman for the Essex Rubber Co., Trenton, N. J., where he had been employed many years. His mother is his only survivor.

Burial was at Morrisville, Pa.

William P. Hayes

WILLIAM P. HAYES, for several years secretary-treasurer of the old Trenton Rubber Co., was injured by an automobile on May 23 and died a few days later in Mercer Hospital. He had served also as warden of the New Jersey State Hospital at Trenton. Mr. Hayes was born in England 83 years ago and moved to Trenton when a young man. He was a Mason and treasurer of the Trenton Y.M.C.A. A widower, he is survived by a daughter.

Burial was in Riverview Cemetery.

Isaac Q. Gurnee

ANOTHER pioneer was removed from the ranks of rubber manufacturers on May 20 when Isaac Quinby Gurnee died after a long illness. He had been president, treasurer, and purchasing agent of the Superior Hard Rubber Co., Butler, N. J., which he founded in 1919. He began his long association with the rubber industry in 1879, when, as a lad of fourteen, he became office boy for the Rubber Comb & Jewelry Co., which later was known as the Butler Hard Rubber Co. Mr. Gurnee soon had charge of the clerical work and, after the firm's reorganization in 1898 as the American Hard Rubber Co. was made department superintendent. His next promotion was as principal assistant to the plant superintendent in the sundries department. This post he resigned in 1919 to start his own company.

The deceased was interested, too, in other business activities in Butler. He was one of the organizers of the First National Bank, serving as a director until his demise. He owned the Pequannock Coal & Lumber Co., which he founded in 1903, and was also one of the largest stockholders of the Apollo Magneto Corp., Kingston, N. Y.

Isaac Gurnee was born in Parsippany, N. J., March 3, 1865. He attended Bloomingdale Academy. He was a recognized historian of North Jersey and contributed many articles regarding local events and personalities in the early days of Bloomingdale, which included Butler at that time.

He leaves his wife, two sons, five grandchildren, one great-grandchild, two brothers, and two sisters.

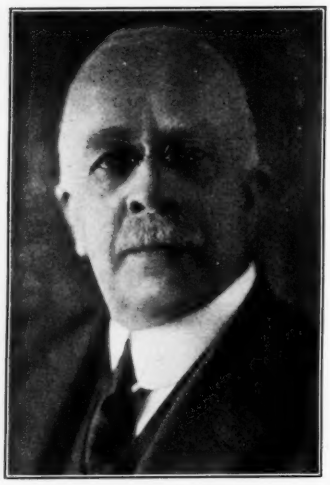
Funeral services were conducted May 23. Burial was in Mt. Rest Cemetery.

Henry A. Morss

AFTER a short illness Henry Adams Morss, president, treasurer, and a director of the Simplex Wire & Cable Co., 79 Sidney St., Cambridge A, Boston, Mass., and president and director of the Simplex Wire & Cable Co. of California, San Francisco, Calif., died May 6 at Boston. He had been with the company since June 3, 1893, when it was known as the Simplex Electrical Co. The name was changed to the present one in 1913. Mr. Morss was a director of the firm from its incorporation in 1895 until his death, was vice president from December 7, 1903, to March 26, 1918, then became treasurer and clerk, and was made president and treasurer February 19, 1934. The deceased also held several important executive positions with The Morss & Whyte Co. and The Simplex Electric Heating Co., firms largely controlled by his family and now out of business.

Henry Morss was born in Boston, August 30, 1871. He attended the local schools and Massachusetts Institute of Technology, having graduated from the latter in 1893 with a B.S. degree.

He had many outside charitable, educational, and business interests. He served M. I. T. in various capacities, as president of the Alumni Association, assistant treasurer, treasurer, member of the corporation and of the executive committee. Mr. Morss was also a director of many organizations, including A. D. Little, Inc., and the Webster & Atlas National Bank. He was also a trustee of Radcliffe College, Morss Real Estate Trust, and a president and a vice president of the Boston Children's Friend Society.



Henry A. Morss

He leaves his wife, three sons, two daughters, and a brother.

Funeral services were held at Old South Church, Boston, May 8.

C. B. Peschmann

A HEART attack on June 14 led to the death of Clarence B. Peschmann, long identified with the rubber industry, at his home in Boston, Mass. Among the positions he had held were assistant manager of the New England district and Cleveland branch manager, both for the Goodyear Tire & Rubber Co.; manager, eastern sales division, The Denman-Myers Cord Tire Co.; and special sales work in the Newark territory for the Fisk Rubber Co.

He was born in South Dakota 61 years ago, but lived the greater part of his life in Boston. Mr. Peschmann belonged to the Scottish Rites branch of Masonry and Aleppo Temple, Mystic Shrine.

Surviving is his wife.

Funeral services were held June 16. Burial was in Whitman.

J. A. Nieuwland

WHILE on a visit to Catholic University, Washington, D. C., on June 11, Julius A. Nieuwland, C. S. C., professor of chemistry at Notre Dame University, North Bend, Ind., suffered a fatal heart attack. Father Nieuwland was very well known as a chemist and one of his important contributions was the discovery of the process that led to the development of the synthetic rubber, "DuPrene." He was awarded the Nichols Medal for 1935 by the American Chemical Society for his work. He also invented a poison gas, Lewisite, and won renown as a botanist. The scientist has also done other big things in organic chemistry, and his loss will be keenly felt—for the scientist, the priest, the educator, and the man.

He was born in Hansbeke, Belgium, February 14, 1878, but his parents came to America when he was quite young. He was educated in the parochial school at South Bend. He received a B.A. from Notre Dame in 1899. Then he attended Catholic University and was ordained a priest in 1903. In 1911 he was made a Doctor of Science.

FINANCIAL

Lee Rubber & Tire Corp., Conshohocken, Pa., and subsidiaries. Six months ended May 30: net profit after federal taxes, depreciation, interest, and other charges, $101,296, equal to 39¢ a share, against $112,970, or 44¢ a share, for first six months of previous fiscal year; net sales, $4,100,427, a 10% rise.

Firestone Tire & Rubber Co., Akron, O., and subsidiaries, including the Firestone Service Stores. Six months ended April 30: net profit of $2,754,675, after taxes, depreciation, depletion, interest, and other charges. After dividend requirements on the 6% preferred stock these earnings were equivalent to 70¢ each on 1,933,317 shares of $10-par common stock. In the corresponding six months a year before earnings were $2,155,084, or 40¢ each on 1,897,597 shares of common stock.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Pfd.	$2.00 q.	July 1	June 16
Collyer Insulated Wire Co.	Com.	$0.15 q.	July 1	June 24
Dominion Rubber Co., Ltd.	7% Pfd.	$1.75 q.	June 30	June 25
Faultless Rubber Co.	Com.	$0.50 q.	July 1	June 15
Firestone Tire & Rubber Co.	Com.	$0.30 q.	July 20	July 3
Garlock Packing Co.	Com.	$0.25 q.	June 30	June 20
Garlock Packing Co.	Com.	$0.25 extra	June 30	June 20
General Tire & Rubber Co.	Pfd.	$1.50 q.	June 30	June 20
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$0.62½ q.	July 2	June 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	5% Pfd.	$0.63 q.	July 2	June 15
Jenkins Bros.	Com.	$0.12½ q.	July 10	June 26
Jenkins Bros.	Com.	$0.12½ extra	July 10	June 26
Jenkins Bros.	Founders' Shares	$0.50 q.	July 10	June 26
Jenkins Bros.	Founders' Shares	$0.50 extra	July 10	June 26
Jenkins Bros.	7% Pfd.	$1.75 q.	July 10	June 26
Lee Rubber & Tire Corp.	Com.	$0.25	Aug. 1	July 15
Pahang Rubber Co., Ltd.	Com.	$0.10 interim	June 25	June 16
Rex-Hide, Inc.	Com.	$0.25 q.	July 15	June 30

EASTERN AND SOUTHERN

INDUSTRIAL activity continues to withstand the forces which usually make for recession at this season. Certain industries have even slightly increased production because of orders received in anticipation of higher third-quarter prices. Seasonal changes are being held at a minimum in all parts of the country, and there is a definite absence of fear of any noticeable setbacks in the near future.

June employment continued at the May level in most sections of the nation, with improvement in some districts. Shortages of skilled labor are still being reported. Decreased railroad fares, effective since June 1, led to the hiring of more help by some eastern railroads.

Buying continues active in the machine tool market for most types of standard equipment, despite a 10% increase in milling machine prices. Practically all plants are working to capacity, and with so many orders, deliveries are slow. Operations at Pittsburgh steel mills rose to a high level for recent years, with the industry as a whole producing above 70%, the highest rate of the year; while normally this is the season for declines.

The outlook for business continued promising in most agricultural districts, especially in the South, where drought conditions have been broken. Business continues at a lively pace in Texas and neighboring states where the effect of the Texas Centennial is stimulating on trade. In Virginia building permits show a sharp increase for June over last year's figures; while the Atlanta district is maintaining expansion of all major lines of trade. Department store employment was the greatest this time of year since 1930.

At a recent national convention of purchasing agents those in attendance were told, "the longer outlook is for higher price levels generally, but tempering the situation for current uncertainties, it would seem that most commodities should be purchased some two to four months ahead of requirements as they occur." Well-filled stocks of cotton goods, rayon, and silk and of the industrial group of commodities including rubber, lubricants, paper, and other miscellaneous items were advocated. Rubber is one of those commodities that show rather marked recession in supply situation in this country although there is far from any actual stringency from stock standpoint. While a firm price trend still prevails, radical upward movement is not expected; in fact noticeably higher levels in this market will bring out further efforts toward production from secondary rubber as well as synthetic materials which might play an important part in this supply-demand relation. Purchases in this market should remain at least six months ahead of operations.

Blank & Stoller

John P. Coe

U. S. Rubber Changes

Naugatuck Chemical, Division of United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., has appointed John Parks Coe general sales manager to succeed Ernest B. Curtis, who joined R. T. Vanderbilt Co., 230 Park Ave., New York, to become assistant to Dr. A. A. Somerville. Naugatuck Chemical also promoted John E. Caskey, assistant factory manager at Naugatuck, Conn., to the position of factory manager, left vacant by Mr. Coe's advance. Robert E. Casey now is sales manager of rubber chemicals, reclaimed rubber, and labels.

U. S. Rubber Products plans to move about one third of the production operations of the sundries department at Naugatuck to Providence, R. I., about July 1 in order to make available more space for the rubber shoe division. Production involved in the transfer includes hot water bottles, ice caps, bulbs, play balls, footballs, tubing, bathing suits and caps, and syringes. According to the company, removal "emphasizes the need to develop to manufacture a high quality and low cost line of footwear which will enable us to get a larger share of the industrial business."

Fred S. Carpenter, factory manager, Sampson Tire & Rubber Corp., Division of U. S. Rubber Products, Los Angeles, Calif., is in the East in connection with both personal and business affairs. Mr. and Mrs. Carpenter will spend some time with relatives and friends in Connecticut and expect to return to Los Angeles about mid-July.

General Sales Manager

Mr. Coe was born in Rock Falls, Ill., December 15, 1889, and educated at the local grade schools, Topeka, Kan., high school, University of Kansas, Washburn College (A.B., chem., 1911), and Massachusetts Institute of Technology (B.S., chem. engr., 1913).

From 1913 to 1914 he was connected with factory production operations at the G & J Tire Co., Indianapolis, Ind. From 1914 to 1917 he worked on tire development at the General Laboratories of the United States Rubber Co. in New York. The next year was spent at the laboratories, Goodyear India Rubber Glove Mfg. Co., Naugatuck, and Revere Rubber Co., Providence, on gas mask development for the United States Navy. Mr. Coe was successful in developing a new type of mask adopted by the Navy. Then from 1919 to 1926 Mr. Coe again served in the General Laboratories in New York, where he, successively, was in charge of tire development, processes and compound development, application of new processes and latex development, and laboratory and factory developments of flat band processes at the Hartford Rubber Works Co. and Morgan & Wright. Mr. Coe during the years 1927 to 1929 organized U. S. Rubber's tire development department at Detroit, Mich., where he was in charge of tire development, construction, and compounding. The next year he became assistant to the president of Naugatuck Chemical, New York, and then from 1931 until his recent new appointment was factory manager of Naugatuck Chemical, Naugatuck.

Mr. Coe belongs to the American Chemical Society, is an incorporator of the Naugatuck Savings Bank, and chairman of the Naugatuck District Boy Scouts. He is married and has a son and a daughter.

National Association of Waste Material Dealers, Inc., Times Building, New York, N. Y. The golf tournament, sponsored by the New York Metropolitan Luncheon Club of the association, held at the Larchmont Country Club, June 15, was in every way a success. About 40 persons participated in the tournament, and a group of fifty sat down to dinner in the evening, where entertainment was provided and prizes were distributed. Edward B. Friedlander, president of the association, presided at the dinner, and with him at the head table were those who helped make the affair the success it was by donating cups and prizes. These were Julius Muehlstein, H. Muehlstein & Co., Inc., donor of the Directors' Trophy and more than a dozen other prizes; Charles H. Lipsett, donor of the *Waste Trade Journal* Cup; Abner Koplik, Castle & Overton, Inc., who gave a golf bag; and Arthur Rosenfeld, Wm. Steck & Co., Inc., through whose invitation the tournament was held at the Larchmont Country Club, also provided prizes in the form of quality liquor.

Lee Tire & Rubber Co., Dallas, Tex., again won the contract to supply tires and tubes for State cars and trucks. The cost approximates $200,000 a year. Discounts are 47 and 58% off list prices on passenger car and truck tires and tubes, and 55.9% on solid tires.

Commercial Solvents Corp., on June 1 moved its Philadelphia, Pa., office and warehouse from 701 S. Front St. to more convenient and commodious quarters in the Terminal Commerce Bldg., 401 N. Broad St., where a complete line of industrial alcohols and solvents will be carried for the convenience of manufacturers in the Philadelphia area. E. T. Butler is in charge of the branch.

Active Rubber Co. has leased the store at 2014 Market St., Philadelphia, Pa.

Homestic Mfg. Co., with office in the American Bldg. and factory at 10-14 Arcade Bldg., both in Savannah, Ga., makes rubber mats from junk tires. The plant, which employs 35 workers, all of whom are blind, deaf mutes, or cripples, is operated entirely on independent capital free from any charitable trappings; it pays licenses, rent, and all other overhead on a strictly business basis, pays employes a living wage on a cooperative basis, and enjoys good business from the most representative business houses in the district. Operations began May 1, and the concern uses about ten tons of scrap rubber a week, with the demand threatening the local supply. Homestic Mfg. Co. also has art designing, coloring, and research departments. A modern broom making division forms another part of the enterprise. Orders at present are in excess of production facilities; consequently the company is constantly ordering new equipment to keep up with the demand for its products. T. D. Cook is president and treasurer; while C. S. Montanye is vice president and general manager.

National Association of Purchasing Agents at its recent twenty-first international convention at the Hotel Roosevelt, New Orleans, La., elected as president C. A. Kelley, of the Southern Sierras Power Co., Riverside, Cal., to succeed Fred J. Lucas, of Purdy-Mansell, Ltd., Toronto, Can. More than 1,400 purchasing executives from the United States, Canada, and Mexico attended the convention and elected the following slate of district vice presidents to serve with Mr. Kelley: Wayne R. Allen, Oakland, Cal.; H. M. Lingle, Houston, Tex.; George A. Neesham, Chicago, Ill.; A. J. Mitchell, Grand Rapids, Mich.; W. Allen Traill, Montreal, Canada; Arthur J. Goetz, Monroe, Mich.; H. C. Green, Birmingham, Ala.; George M. Tisdale, New York, N. Y.; and George P. Brockway, Southbridge, Mass. The vice presidents and Mr. Lucas comprise the organization's executive committee for the coming year. The association will hold its next annual meeting in Pittsburgh, Pa., May 24 to 27, 1937.

Chidnoff

Ivan D. Hagar

Sales Manager

Titanium Pigment Co., Inc., 111 Broadway, New York, N. Y., recently elected to its board of directors two new members, Ivan D. Hagar, sales engineer and eastern sales manager, and Henry G. Sidford, manager of the Atlantic branch of the National Lead Co.

Mr. Hagar has been with Titanium in his present post since 1921. His previous business connections follow: chemist, Cementos Hidalgo, Hidalgo, Mexico, 1910-11; chemist, Union Pacific Railroad, Omaha, Neb., 1911-12; chemist, Mound City Paint & Color Co., St. Louis, Mo., 1912-18; sales engineer, New Jersey Zinc Co., New York, 1918-20; production engineer, Devoe & Raynolds, Inc., New York, 1920-21.

He was born in Webridge, Vt., January 6, 1886, and educated at Middlebury, Vt., high school, Middlebury College, and Syracuse University. When he was graduated in 1909, it was with a B.A. degree.

This executive belongs to Fortitude Lodge, F. & A. M., American Chemical Society, American Society for Testing Materials, Downtown Athletic Club, and New York Sales Managers' Club.

Mr. Hagar lives at 315 Magnolia Pl., Leonia, N. J.

"WYEX BLACK"

J. M. Huber, Inc., 460 W. 34th St., New York, N. Y., is announcing a new super-type of carbon black under the brand, "WYEX BLACK." It is at present being produced in limited quantities only at the Huber factory in Wyoming, where a distinctive type of natural gas is available as a raw material. The new black is the result of an extensive research program in which some radical manufacturing improvements have been developed. It is stated "WYEX BLACK" produces a higher degree of dispersion and faster tubing of a tread stock. Its aging properties in a finished tread, particularly as measured by the aged abrasion test, are distinctly above the average type of rubber black, and it develops a resistance to heat blow-out far beyond the average of existing standards.

H. J. Smith, executive of the Continental Machinery Co., Inc., 277 Broadway, New York, N. Y., sailed June 27 on the *Aquitania* on the demand of his clients in Europe. During his trip Mr. Smith will cover the entire Continent in the interests of his company. Just before sailing he stated that although Continental Machinery was just in its infancy, it has been very successful and has plenty of business. It manufactures and supplies rubber plant equipment of every type for every purpose including special latex equipment. The Canadian branch, Continental Machinery Co., Ltd., is at 139 Winnett Ave., Toronto, Ont.

Walter Grote, technical service representative, United Carbon Co., Charleston, W. Va., sailed from New York on May 29 on the *Berengaria* on an extended business tour of Europe.

Howard C. Walthour, controller, Pennsylvania Rubber Co., Jeannette, Pa., suffered the loss of his mother on June 19 when Mrs. Sarah Jane Walthour, 82, died at her home in Greensburg, Pa.

A. L. Viles, president, Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., in response to a survey of employment, wages, and working hours of representative industries throughout the country, conducted by George A. Sloan, chairman of the Consumers' Goods Industry Committee, declared, "Rubber industry generally has maintained code wages and hours. Employment has increased 27% since 1933." The general result of the survey showed employment nearing 1929 levels and voluntary maintenance of improved wage and hour standards.

American Society of Safety Engineers held a meeting early last month in Buffalo, N. Y., to organize a Niagara Frontier chapter. Joseph M. Kerrigan, of U. S. Rubber Reclaiming Co., was elected temporary chairman, and Thomas G. Munro, of General Cable Corp., acting secretary. Committee executives selected follow: program chairman, Jacob B. Zook, Great Lakes Portland Cement Corp.; constitution and by-laws, Philip Williams, Du Pont Rayon Co.; public relations, William H. MacKay, Dunlop Tire & Rubber Corp. Meetings of the new chapter will be held monthly, and at the next session permanent officers will be elected. The organization's purposes are to stimulate and improve accident prevention throughout the Niagara Frontier, and its members are men who conduct the safety activities and accident prevention programs in industrial plants.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y., recently acquired the Harrison Refining Co., New York, N. Y., and Belleville, N. J., refiner of waxes and manufacturer of "Iso-Beeswax," U.S.P., flaked white beeswax, and flaked ceresin. The business will be conducted as the Harrison Refining Division of the American Cyanamid & Chemical Corp. with the same personnel and same high standards of production as heretofore. All communications should be addressed to this division at 350 Madison Ave., New York.

Vulcanized Rubber Co., Morrisville, Pa., continues to operate normally in the manufacture of a variety of hard rubber products. The State Division of Aeronautics has placed a large air-marker with six-foot letters on top of the company's plant.

Rubatex Products, Inc., 277 Park Ave., New York, N. Y., has renewed its lease of the factory property of The Bedford Tire & Rubber Co., Bedford, Va. The New York company holds an option to buy the Bedford property. Both lease and option expire December 31.

Hohwieler Rubber Co., Morrisville, Pa., is installing a gasoline and oil unit to replace the electrical equipment which operates the mixing mill. The concern is very busy and will shortly operate with a night shift. President William Hohwieler, on a business trip through New England, returned with some new orders.

Armstrong Cork Co., Lancaster, Pa., has acquired the Stedman Rubber Flooring Co., South Braintree, Mass. Stockholders of the latter company voted on June 15 to accept the Armstrong offer, details of which are not yet available, and the actual transfer probably will take place in mid-July.

The Twelfth National Exposition of Power and Mechanical Engineering will be held at Grand Central Palace, New York, N. Y., the week of November 30. The rapidly growing interest in this exposition is indicated by the fact that applications for exhibit space have come in at such a rate that floor plans have had to be made for three entire floors instead of the usual two. As in the case of all previous expositions of power and mechanical engineering, since their inception in 1922, the twelfth exposition is under the management of the International Exposition Co., Grand Central Palace. Charles F. Roth is again in charge.

Charles S. Grainger and **Charles S. Butt,** both directors and founders of the Olympic Tyre & Rubber Co., Ltd., Melbourne, Australia, are spending the entire summer studying the tire manufacturing and merchandising business as conducted in the United States and England. Leaving their homeland in April, they arrived in the United States at San Francisco and spent five weeks visiting various rubber plants and executives and suppliers on their way across the country to New York. On May 29 they sailed to England where they expect to remain several weeks, after which a return visit will be made to the United States before sailing from San Francisco to Melbourne where they plan to arrive late in September. Messrs. Grainger and Butt indicate that their business has had a steady growth since its beginning about three years ago. The methods of production and equipment used by the Olympic company in the production of 4,000 to 5,000 tires a week compare very closely with those found here.

Company President

Walter L. Tepper, president of the Martin Rubber Co., 27-27 Jackson Ave., Long Island City, N. Y., manufacturer of rubber goods of all kinds, including a complete line of dental supplies, is one of the youngest important executives in the dental manufacturing industry. He has been with the company since its inception in 1927, becoming president in 1930 after having first served as general manager. Under his leadership and in the face of many obstacles the Martin Rubber Co. has come through the depression in a greatly improved condition. Mr. Tepper informs us that sales of the firm's dental supplies, including Martin Denture Rubber, have increased over 600% in the last five years. He attributes this growth in a large degree to constant advertising.

He was born in New York, N. Y., March 24, 1907, and attended Columbia Grammar School, New York University (A.B., 1928), and Columbia University, where he took post-graduate work in industrial engineering. Mr. Tepper also belongs to Zeta Beta Tau and Metropolis Club. He has been married since July 15, 1931, and has one daughter, Grace Nancy, born May 21, 1934.

In the winter the Teppers live at 320 Central Park West, New York, and in the summer at 63 Park Ave., Elberon, N. J.

Walter L. Tepper

MIDWEST

THE Midwest shares with the East as leaders in escaping the seasonal summer slump because of the vigor which characterizes the current recovery trend. Commodity prices and inventories worked slightly higher in this part of the country.

While the 1936 peak of automobile production has apparently been passed, the rate of assemblies has fallen off very gradually. May production should be close to the April figure, 502,775 cars and trucks, exceeded only by factory sales in June, 1929. In fact in only five months of the history of the industry have assemblies passed the half-million mark; all these months were in 1929. One large automobile manufacturer reported recent sales the greatest on record for its organization. A goodly share of the bonus given last month to war veterans is expected to go to the purchase of automobiles. Recent increases, however, in cost of materials including tires, coupled with higher labor costs in several instances, have led some authorities to expect increased prices for the 1937 automobiles.

Although profits of automobile manufacturers have gained considerably this year, the parts and accessory companies have not done so well. Steel sales and specifications were around the high for the year, but production schedules held steady between 70 and 71%. Plants have shown no signs of slackening operations; in fact some factories have increased output and are preparing for a heavy fall demand. In the St. Louis district small industries also are on good schedules and several have given wage increases. Unemployment, however, has shown but slight improvement. In Kansas the harvest started with a rush, as the weather was favorable to winter wheat cutting, making the market rush a week earlier than usual. The only dark spot in the Midwest is the drought damage in some sections. Many orders to wholesalers and manufacturers have been canceled because of crop conditions.

Fisk Tire Co., Inc., Chicopee Falls, Mass., recently leased a two-story building at 2745 Locust St., St. Louis, Mo., containing 20,000 square feet of floor space, where a branch office and warehouse facilities will be installed. N. H. Taylor is zone manager of the Fisk company.

Kelsan Products, St. Clair, Mich. The firm of P. E. Kelley and Frank M. Sanders doing business under the name of Kelsan Products has been dissolved. Mr. Kelley is retiring from the company to continue on his own endeavors; while Mr. Sanders will remain with Kelsan Products. Mr. Kelley has no further interest in the business; the liabilities are being assumed by Mr. Sanders.

PACIFIC COAST

BUSINESS on the Pacific Coast is just about holding its own. Reports on wholesale trade, though, are more encouraging. Steel mills and building materials manufacturers registered a steady rise in orders; while conditions in all important agricultural sections appear good. Except for a few small isolated strikes, the labor situation is at present considered satisfactory in this part of the country.

Steerwheel Cushion Co., with factories in Los Angeles, Calif., and offices and laboratories at 18 E. Washington St., Phoenix, Ariz., manufactures air and rubber cushioning devices for levers, control rods, grips, etc., of machines and for steering wheels of motor vehicles.

Plant Rubber & Asbestos Works, Portland, Ore., through Frederick Miller, Northwest district manager, reported substantial advances in its general business for the first five months of 1936 compared with the corresponding period a year ago. Recent changes in the company's operations have added greatly to the aggregate turnover, especially with the marine trade and with lumber, pulp, and paper dealers. Mr. Miller further added that the firm's business is on the upgrade and much optimism prevails for the rest of the year; while all the company's affiliate lines also report increased sales with added demands. The Portland concern is affiliated with the Asbestos Supply Co., Seattle, Wash.

NEW ENGLAND

CONDITIONS improved in the New England textile industry, and shoe manufacturers began production of fall goods on a large scale. The distribution of bonus checks had a stimulating effect on retail sales. Factory operations in general are holding up well, with early spring gains fully maintained.

Imperial Chemical Industries, Ltd., London, England. Sir Harry McGowan, chairman of the board and managing director of Imperial Chemical Industries, Ltd., and H. J. Mitchell, president, arrived from England on the maiden voyage of the *Queen Mary*. Dr. W. H. Coates, H. O. Smith, and J. T. Nicholson, directors of the company, also arrived in the United States recently. The arrival of these executives in this country was said to be primarily to visit the centenary celebration of the Ensign-Bickford Co., safety fuse manufacturer, Simsbury, Conn.

Simplex Wire & Cable Co., 79 Sidney St., Cambridge A, Boston, Mass., recently announced the election of the following officers: Everett Morss, Jr., president and treasurer; Charles R. Boggs, vice president and general manager; Philip R. Morss, vice president, clerk, and secretary; and J. Arthur Gibson, vice president and assistant treasurer. William S. Davis continues as sales manager, with George L. Roberts assistant sales manager. Arthur F. Lewis is advertising manager.

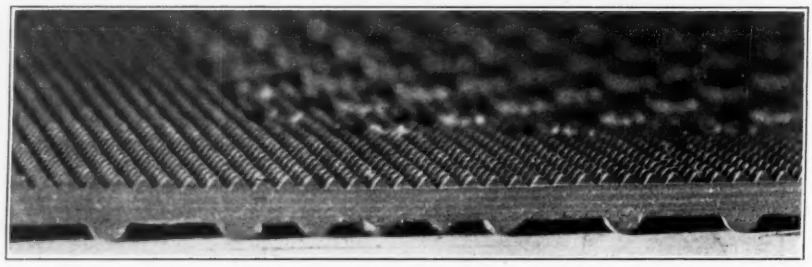
Charles E. Speaks

The Fisk Rubber Corp., Chicopee Falls, Mass., has announced the resignation of President Edward D. Levy, who is succeeded by Charles E. Speaks, whose most recent position, which he relinquished last fall, was as president and general manager of Firestone Footwear Co., Hudson, Mass. Colonel Speaks had joined the Firestone Tire & Rubber Co. in 1913 and remained with it with many promotions until 1935, except for the years 1917-19, when he rendered distinguished service in the transportation division of the United States Army in France.

Paul Benson Hunt recently resigned from United States Rubber Products, Inc., Passaic, N. J., to take charge of all engineering activities of the Paragon Rubber Corp., Easthampton, Mass., now moved from Brooklyn, N. Y. Mr. Hunt was born at Galena, Ill., in 1884. Being of a family traditionally engineers, he was educated at Armour Institute. Then he engaged in electrical engineering in 1908 with Allis Chalmers Co. In 1915 he entered the engineering phase of rubber industry with the Federal Tire Co., Milwaukee, Wis., later with Lockwood-Green & Co. in charge of ehe equipment specifications and installation in the expansion program of the Hartford Rubber Works Co., Hartford, Conn., in 1919. The following year Mr. Hunt became associated with the Central Engineering Department, Shoe Division, U. S. Rubber Co., with engineering consultation responsibilities in 16 plants of that company. In 1928 he was placed in charge of the engineering department of the three plants of the Rubber Regenerating Co., a division then of U. S. Rubber. In 1931 he was called into the Mechanical Division of U. S. Rubber at Passaic, which he left for his new duties with Paragon.

Platform-Type Matting

A NEW type of rubber matting has been developed by the mechanical rubber goods division of The B. F. Goodrich Co., Akron, O., which is said to be particularly adapted for use in office, apartment, and store buildings as a means of providing maximum safety, foot comfort, floor protection, and cleanliness. It is a perforated mat of the platform type. The top surface, instead of being corrugated, consists of a series of small pyramids. This pyramid design provides an effective scraping surface regardless of the direction of the traffic. The under surface has a large pebble design which serves to keep the mat off the floor and permits underneath ventilation and drainage. This feature makes possible a matting which is exceedingly soft to walk on, easily cleaned, and will not sweat or clog with snow. This new platform type matting is made ⅜-inch thick in black only and is available with beveled edges, if so desired by the customer.



New Goodrich Matting

OHIO

TIRE production has been increasing, with the larger demand for original equipment tires supplemented by the seasonal trend in renewal tire sales. The latter probably have been stimulated somewhat also by the recent general increase in retail tire prices.

The labor situation in Akron on the surface seems rather calm, but underneath is a deep fear of general strike trouble to be suddenly precipitated, as by summer layoffs soon due.

Operations in steel works advanced further recently in response to the continued heavy demand for material for immediate consumption. Paint manufacturers this spring enjoyed the best season since 1930, especially in industrial paint sales and those for maintenance and house work.

Leader Rubber Products Co., Stilwell Ave. and North St., Fremont, recently incorporated with 250 shares of no par value, manufactures molded rubber goods, including knife handles, door stops, kitchen scrapers, and toys. Charles A. Petterson, one of the incorporators, stated the company would employ eight men in two shifts. All products are marketed by a sales agency in Akron, and Mr. Petterson declared he had enough orders ahead for the next six months.

The Lima Cord Sole & Heel Co., Lima, at a meeting of the directors June 12 appointed Herbert A. Derry general manager of all activities. Sales, factory management, and purchasing of raw materials will be under his direct supervision. Mr. Derry was with the United States Rubber Co. for 21 years, for the last ten as sales manager of the shoe products division. He has a very wide acquaintance of long standing among shoe manufacturers, wholesalers, etc., and is well known by many brokers and suppliers of raw materials. In addition to soles and heels Lima Cord is marketing several mechanical items; while others are being vigorously researched.

Goodrich News

Every tire dealer in the United States who has sold Goodrich tires for five years or more will receive during 1936 an award, a wall plaque, 12 inches high, from J. D. Tew, president of The B. F. Goodrich Co., Akron, in recognition of the dealer's association with the company. These plaques will be presented for five, ten, 15, 20, and longer five-year periods of selling the company's products. Each dealer will receive a plaque showing his length of continuous association in five-year periods. Upon completion of added five-year periods, other recognition will be given. The plan is also being followed with dealer representatives of the mechanical goods division of the company.

Goodrich Plaque for Dealers

Lester H. Mercer, sundries sales manager, Miller division, resigned June 30 after 23 years with Goodrich to become director of the Red Cross Products division of Johnson & Johnson, Inc., New Brunswick, N. J.

Ernest A. Doerschuk, Goodrich general credit manager, was given his 20-year service pin, together with about 120 others who have completed 20 years with the company since last December, at a ceremonial of the Twenty Year Service Club on June 27. President J. D. Tew made the presentations. With the new class, this club has nearly 1,500 members on its roster, of which more than 1,200 are on the active payrolls of the company.

Henry F. Schippel

Swan Rubber Co., Bucyrus, according to President Mort Nussbaum, is erecting a 50-foot brick addition to its plant on E. Mansfield St., which, when completed, will house new hydraulic presses. Many additional workers will also be hired to take care of the increased demand for the company's molded rubber goods. Six years ago Swan Rubber employed between twelve and twenty men part time to make baby carriage tires. Now the firm uses 150 employes, and the main plant is running in three eight-hour shifts a day; while the remainder of the plant operates eighteen hours daily. Swan at present manufactures tires for baby carriages, tricycles, lawn mowers, etc., brake linings, rubber pedals, handle grips, garden hose, and numerous small rubber articles.

J. Penfield Seiberling, vice president and sales manager, Seiberling Rubber Co., Akron, on a flying visit in a private plane June 4 to J. P. Byrne Co., 238 W. Genesee St., Syracuse, N. Y., local distributer of Seiberling tires, stated that with price wars eliminated, the tire industry is operating at a profit the first time since 1929. The first four months of 1936 show a 10% increase in unit sales over the 1935 period. The outlook for the rest of 1936 is very good. Mr. Seiberling further declared the greatly increased new automobile sales have called for many more new tires as well as provided a constantly increasing replacement market.

The Imperial Electric Co., manufacturer of motors and generators, Akron, has appointed George M. Snodgrass general sales manager. For the past fifteen years he had been with Fairbanks-Morse & Co., where he advanced to the position of general sales manager of the electrical division. He is also quite active in National Electrical Manufacturers Association.

Tire Engineer

Foremost among the tire engineers of America is Henry Frederick Schippel, tire design and technical service engineer with The B. F. Goodrich Co., Akron, O., since 1925. But Mr. Schippel began his successful career in Canada in 1912 when he started as an engineer with the Canadian General Electric Co., Peterborough, Ont. Then from 1914 to 1917 he was a lecturer in electrical engineering at McGill University, Montreal, P. Q. He next became a research engineer with Canadian Consolidated Rubber Co., Montreal, but resigned in 1919 to take a similar position with Ames-Holden-McCready, Montreal. The following year saw him development engineer of Ames-Holden Tire Co., Kitchener, Ont., he was made tire superintendent in 1922 where he remained until he joined Goodrich in 1925.

Mr. Schippel is the author of "Fabric Stresses in Pneumatic Tires," "Volume Increase of Compounded Rubber under Strain," "Airplane Tires and Wheels," and "Uses of Rubber for Transportation." Among the organizations to which he belongs are Society of Automotive Engineers and National Aeronautic Association.

He was born in Montreal, December 17, 1891. He attended McGill University, receiving a B.Sc. in electrical engineering in 1912.

His address is 203 Casterton Ave., Akron, O.

Roger Stanley Firestone, fifth son of Harvey S. Firestone, Sr., chairman of the board, Firestone Tire & Rubber Co., Akron, recently was reported engaged to Miss Mary Seagrave Davis, of Lawrenceville, N. J. The wedding will take place in early autumn.

A. Schulman, Inc., rubber broker, 577 High St., Akron, O., has changed its Boston, Mass., address from 250 Stuart St. to 736 Statler Bldg.

Controlastic

Controlastic is a new type of latex thread suitable for the garment industry. This material is a patented product unique in construction: it is made up of a tubular laminated latex sheath surrounding a textile core thread inserted in the sheath under any predetermined elongation desired. In the corset industry particularly this construction is of great importance since it results in a fabric practically 100% proof against needle cutting.

Prominent Technologist

The name Ray Putnam Dinsmore is well known in the rubber industry because of its owner's many successful activities therein. Now he is assistant to the factory manager, Goodyear Tire & Rubber Co., Akron, which he joined in July, 1914, after his graduation from Massachusetts Institute of Technology, a young chemical engineer holding a B.S. degree. He remained in the Goodyear experimental department until April, 1915, when he was made a compounder. Then until 1919 Mr. Dinsmore served as assistant to the chief chemist at the company's Canadian plant. He next became chief chemist at the Goodyear California factory, but in November, 1921, was returned to Akron as chief compounder, being promoted to chief chemist in January, 1923. In 1932 he was named to his present post. Mr. Dinsmore in the past four years has been devoting special attention to research and the commercializing of new products and organizing and equipping new factories. He has also written several papers and taken out many patents of rubber interest.

Mr. Dinsmore is active in the affairs of the American Chemical Society, having served as a counselor and division chairman. Besides he is a registered chemical engineer in the State of Ohio and a fellow of the American Association for the Advancement of Science,

R. P. Dinsmore

and of the Institution of the Rubber Industry (British). In 1931 he was appointed honorary secretary of M. I. T. to represent it in the Akron district, assisting prospective students. Other organizations to which Mr. Dinsmore belongs are American Institute of Chemical Engineers and Akron University, Portage Country, and Chemists' (N. Y.) clubs.

He was born April 24, 1893, at Tewksbury, Mass. His present address is 795 Merriman Rd., Akron.

Goodrich Executive

Frank Garon Morley, vice president and general manager of The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., Canada, has been with the Goodrich organization since 1916, when he joined the auditing department in Akron. In 1917 he acted as traveling auditor and two years later was appointed to the treasurer's department. In 1923 Mr. Morley was sent to the Canadian company as credit and oper-

(*Continued on page* 64)

Ashley & Crippen

F. G. Morley

NEW JERSEY

EARLY summer finds most New Jersey rubber manufacturers busy and optimistic over prospects for the remainder of the season. Some report more inquiries for business, indicating the output of various goods will be better. Abundant grain and fruit crops this year will have good effect upon the rubber industry in general.

Jos. Stokes Rubber Co., Trenton, is the busiest rubber plant in this section. The company manufactures battery containers, vents, and covers and all hard rubber products used in the automobile and electrical industries, and in the surgical world, as well as hard rubber pipes and pipe fittings essential to the chemical trade. Uncle Sam is a very good customer. Battery containers are turned out for the Navy, the field corps, and the United States Army. Fleet planes likewise are equipped with the Stokes product. Nearly every day a government inspector is on the premises to inspect equipment for some branch of the service. The Stokes firm, which is running at capacity at its Trenton and Canadian plants, is the largest producer of hard rubber battery containers in the world, according to Milton H. Martindell, vice president, treasurer, and general manager, who has been on a business trip to the Midwest and the Stokes Canadian factory.

Mercer Rubber Co., Hamilton Square, through a company official, stated: "After a slow start due to the unseasonable winter weather conditions have improved to such an extent that the first half year should be the best both in volume and profit since 1929. Disturbing factors seemed to iron out easier than in the past, and it looks as if the next few years will be the most interesting and profitable with a few provisos injected."

The United States has leased 50,000 square feet of space of the former Ajax Rubber Co., Trenton, as a unit for the Civilian Conservation Corps.

Johnson & Johnson, New Brunswick, recently included checks for 5% of their earnings last year in payments to executives and all employes. R. W. Johnson, president, said that this bonus was a "reflection of improved conditions in the business." The company reported more persons employed than since 1929.

Lambertville Rubber Co., Lambertville, expects to shut down shortly for a period of two weeks to make necessary repairs and take inventory. The company has been busy since last fall and will resume with a full force after opening again.

Near Para Rubber Co., Trenton, reports a dropping off in business during the past month.

Acme Rubber Mfg. Co., Trenton, is enjoying a nice volume of business, with more inquiries being received.

(*Continued on page* 62)

Rubber Industry in Europe

GREAT BRITAIN

Rubber-Bitumen Roads

The use of rubber and bitumen in road-surfacing material is discussed in a recent issue of the *Bulletin of the Rubber Growers' Association* by W. S. Davey, of the London Advisory Committee for Rubber Research (Ceylon and Malaya). The staff of the latter organization has been investigating the problem in collaboration with Messrs. Attwool and Broome, of the Limmer & Trinidad Lake Asphalt Co., and the R. G. A. Technical Research and Development of New Uses Committee. Bitumen is widely used in road-surfacing, the annual consumption estimated at 10,000,000 tons, so that if a satisfactory method of incorporating even a small amount of rubber were developed and the mixture won approval, an enormous field for the use of rubber would be opened up.

The investigations were made with special reference to the effects of rubber on bitumen for use as cement or binder in the manufacture of asphalt. Various types of granulated rubber as well as latex were used in combination with natural asphalt and a bitumen obtained as a residue from the distillation of crude petroleum oils. Difficulty was experienced in dissolving rubber, even in crumb form, in bitumen, and temperatures over 160° C. had to be used to obtain homogeneous solutions of nine parts of rubber in 100 parts of bitumen.

A convenient method of incorporating the rubber and one considered more favorable to the rubber was that in which rubber was dissolved in a flux oil, and the bitumen cut back with the rubber-oil flux. Laboratory tests indicated that the addition of rubber without over-heating helps reduce the disadvantages experienced in asphalt paving. The hardness is increased, the softening point raised, thereby rendering the asphaltic cement more resistant to high atmospheric temperatures, and finally the elasticity is increased with consequent improved resistance to deformation.

In 1933 experimental stretches were laid on a private road owned by the Limmer company, with the cold asphalt process, mentioned above, being used. About one year ago an area of 400 yards was laid on a public highway and so far has given satisfactory results. A feature of this road was the fairly non-skid sandpaper surface thought due to the reduction of the plastic flow of the binder by the introduction of the rubber. Further experiments will be undertaken. The results obtained indicate that the improvement in the material justifies the extra cost of the rubber.

Dunlop Rubber Co.

At the thirty-seventh ordinary general meeting of the Dunlop Rubber Co., Ltd., held in London on May 8 the chairman, Sir Eric Geddes, gave interesting details of recent developments. Like many another large manufacturing and exporting concern, the company, feeling the effects of exchange difficulties, higher tariffs, growing economic nationalism in foreign countries, must report reduced export profits. On the other hand, advantage has been taken of the nationalistic tendencies abroad to erect local factories. The establishment of these plants has, of necessity, taken work away from the home factories, but attempts have been made to counteract this by the development of new products as Dunlopillo upholstery, tires for horse-drawn vehicles and wheelbarrows, airplane equipments, etc.

Improved sales are reported for various types of tires; the 1935 sales for Dunlop giant tires reached a new high record, thanks to the growth of road transport. The firm was out of competition in certain foreign products as the import duties are more than met by foreign export subsidies. The French Dunlop factory showed improved business despite the difficult situation prevailing in France. The German concern increased its business substantially, but is still not permitted to make remittances. Of the recently established overseas factories, that in Cork, Ireland, is now producing giant, car, and cycle tires, rubber footwear, and tennis balls. Profits were satisfactory for 1935. Production of tires in the new South African factory, begun in January, 1935, is expanding rapidly. Prospects for 1936 are considered good. The new factory in India will not begin production until the beginning of August.

As to the plantations company, profits increased £20,000 against the preceding year's figure. During the last ten years over 35,000 acres of new rubber have been planted, most of which has been budgrafted. The mature budded area is now 6,000 acres, and yields of 1,000 pounds per acre have been obtained from areas tapped less than two years. Still better results in the near future are confidently expected.

British Notes

A total of 1,105 Dunlopillo mattresses were ordered for the *Queen Mary*.

A pneumatic type of harness, combining comfort for the horse and durability, has appeared on the market.

The Goodyear Tire & Rubber Co., (Great Britain), reports net profits of £175,857 for 1935 against £169,837 for 1934. Dividends for 1935 came to 12% against 15% the year before, and the balance carried forward was increased from £174,548 to £230,143. The nineteenth Goodyear branch in the United Kingdom was opened May 1 at Norwich.

The North British Rubber Co. closed its 1935 accounts with a trading profit of £20,651. After paying interest on debenture stock and allowing for depreciation, a balance of £516 was carried forward. No dividend was paid on the 5% cumulative preference shares, and none has been paid since June, 1930.

The white rubber paving laid about ten years ago in New Bridge St., London, E.C.4, does not appear to have been very successful and is to be broken up. Universal Rubber Paviors, Ltd., have received an order to repave the area with its improved black rubber Gaisman blocks with the so-called Bramble surface. It is interesting to learn that the wood blocks in the same street seem to have been more durable than the rubber blocks.

GERMANY

The National Convention of German Chemists will take place July 7 to 11 in Munich, and as part of the occasion the Deutsche Kautschuk Gesellschaft will assemble for its ninth annual meeting July 8 to 10.

The Berlin Section of the Deutsche Kautschuk Gesellschaft met April 30, when Werner Esch spoke on "Facilitating the Incorporation of Fillers into Rubber Compounds."

The Association of German Engineers celebrated its eightieth anniversary in Darmstadt, May 26 to 29, in conjunction with the centenary of the Darmstadt Technical Institute. A. Koch discussed "The Properties of Artificial Rubber and Its Possibilities of Application."

The automobile industry is making rapid progress under the Hitler regime. Whereas the output index for the industry in 1932 was 31.4, it had soared to 173.2 for the first quarter of 1936.

In 1928, German factories produced about 100,000 cars; in 1935 the figure was 240,000 cars. Automobile exports, also increasing, for the first quarter of 1936 represented a value of 18,900,000 marks against 10,400,000 and 10,300,000 in the corresponding periods of 1935 and 1934 respectively. At the same time tire exports for automobiles rose from 30,230 units in the first three months of 1934 to 39,668 in 1935 and 46,967 in 1936. Crude rubber imports the first quarter of 1936 were 158,690 quintals against 146,984 quintals in 1935.

The Kolnische Gummifaden-Fabrik vorm. Ferd. Kohlstadt & Co., Koln-Deutz, reports a decrease in 1935 sales as compared with those for 1934. Prices for exports could not be maintained; while, on the other hand, the price of crude rubber rose. The year closed with a loss of 46,190 marks against net profits of 24,739 marks in 1935.

The Deutsche Dunlop Gummi-Co. A.G., Hanau a.M., reports for 1935 net profits of 692,321 marks on a capital of 9,000,000 marks. Business during 1935 showed a gratifying increase, which appears to be continuing in 1936.

The Deutsche Kabelwerke A.G., now combined with the Kabelwerk Rheydt A.G., declared a 6% dividend over 1935. The value of the export business during the year increased by more than 35%, and development in the current year continues satisfactory. The Deka factory, which belongs to the concern, has been producing tires from synthetic rubber. It may further be mentioned that the Julius Friedlander Gummiwarenfabriek G.m.b.H. now also forms a part of the Deutsche Kabelwerke.

EUROPEAN NOTES

Exports of rubber goods from France during 1935 included: waste rubber, 19,383 quintals against 28,425 quintals; pneumatic tires and tubes for vehicles, 72,642 quintals, value 104,990,000 francs, against 71,890 quintals, value 101,893,000 francs; pneumatic tires and tubes for bicycles, 12,168 quintals, value 15,583,000 francs, against 14,541 quintals, value 18,416,000 francs; packing, 942 quintals, value 952,000 francs, against 887 quintals, value 1,084,000 francs; footwear, 7,980 quintals, value 9,453,000 francs, against 6,784 quintals, value 8,753,000 francs; sanitary goods, 205 against 144 quintals; rubber thread, 301 against 376 quintals; and other rubber goods, 16,848 quintals, value 16,757,000 francs, against 18,180 quintals, value 19,067,000 francs.

The Societe Anonyme de Pneumatiques Dunlop, Paris, reports net profits for 1935 of 1,017,205 francs. This together with the balance left from previous profits makes a total of 2,554,433 francs, which have been carried forward.

Approvisionnement General de Caoutchouc was recently formed at Paris with a capital of 500,000 francs to deal in raw materials including rubber and eventually to produce articles utilizing them. The first directors are Thomas Adam Clayton, George Stanley Walkley, and Edouard Hoffmann.

Caoutchouc Verdun will manufacture rubber goods, particularly molded goods for protection against gases. Headquarters are at Paris, and the capital is 50,000 francs.

Kabelfabrik A.G. of Cracow, Poland, reports net profits for 1935 of 151,809 zloty on a capital of 10,800,000 zloty. F. W. Schweikert, Lodz, closed 1935 with a loss of 193,447 zloty; the capital is 10,200,000 zloty, and reserves, 7,580,000 zloty. The Wargum concern, Warsaw, capitalized at 500,000 zloty, had net profits of 75,438 zloty in 1935.

The Finska Rubber Works, Helsingfors, Finland, reports net profits of 13,800,000 finmarks against 7,300,000 finmarks.

Crude rubber imports into Hungary in 1935 were only 19,698 quintals against 24,449 quintals the year before. There was an increase in several lines of rubber goods; thus footwear imports came to 635 quintals, value 383,000 pengo, against 476 quintals, value 322,000 pengo; hard rubber, 331 quintals, value 45,000 pengo, against 277 quintals, value 32,000 pengo; other soft rubber goods, 218 quintals, value 141,000 pengo, against 176 quintals, value 106,000 pengo; pneumatic tires increased in quantity from 2,378 to 2,392 quintals, but the value decreased from 702,000 to 687,000 pengo. Rubber thread declined steeply from 416 quintals, value 287,000 pengo, to 182 quintals, value 116,000 pengo.

Honefoss Gummi-Industri A/S., Honefoss, Norway, capitalized at 500,000 kroner, a new factory, is now being equipped to start operations this fall on roll and tank covering, footwear, and a general line of mechanical hard rubber goods. The plant, covering 40,000 square feet on one floor, expects to employ between two hundred and three hundred workers. Major Nils Askvig is president of the concern, and L. Dahl Riddervold, general manager. The latter, for six years general manager of Den Norske Kalosje Gummivare Fabrik, recently spent a fortnight in the United States contacting with machinery manufacturers and rubber plants. Mr. Riddervold is a mechanical engineer, a graduate of Horten Technical School of Norway, Class of 1903. From 1905 to 1916 he worked in America as a constructional engineer erecting various textile plants in New England.

Carbon black imports into Czechoslovakia increased from 1,145 metric tons in 1934 to 1,546 tons in 1935. Domestic production has been started, and is reported to be sufficient to meet the home demand.

Spain's automobile tire and inner tube market may now be said to be virtually a monopoly of national manufacture, according to a report of May 19 from Assistant Trade Commissioner Miles Hammond, of Madrid. Tariff barriers have been erected to such an extent that any appreciable importation is practically impossible, with imports being limited to the uncommon sizes not manufactured in Spain. Leading tire manufacturers in Spain are the Spanish branch of Italian Pirelli, Spanish branch of French Michelin, and the Spanish branch of an American tire manufacturer. A fourth company began tire production in 1935, the Spanish branch of German Continental, near Santander. Some tire distributers believe there are too many manufacturers for the available business in Spain, claiming that any one of the three leading manufacturers could amply supply the market. As a result, competition on the Spanish tire market is extremely keen. Imports of tires by Spain in 1935 amounted to 422,628 kilos compared with 850,519 kilos in 1934 and with 2,743,140 kilos in 1933.

NEW JERSEY

(*Continued from page 60*)

Lawrence M. Oakley, of Essex Rubber Co., Trenton, returned from a week's business trip through New England, where he checked up on the jobbing houses and company branches. The company is operating normally.

Youngs Rubber Corp., Trenton. Eighteen girl employes staged a walkout recently as a result of a wage dispute. The management soon filled their places with new hands.

General C. Edward Murray, president of the Crescent Insulated Wire & Cable Co., Trenton, and his family are spending the summer at their cottage at Spring Lake, N. J.

Whitehead Bros. Rubber Co., Trenton, continues to operate with a double shift, with business good in all lines.

Puritan Rubber Co., Trenton, finds business very good. Orders for rubber tiling are increasing.

Pierce-Roberts Rubber Co., Trenton, continues with two shifts in manufacturing druggists' sundries.

Eric A. Newman, chief engineer of the Pocono Co., Trenton, was made state treasurer of the New Jersey State Association of Power Engineers at the annual convention at Trenton. He is past president and former conductor of the association.

The Thermoid Co., Trenton, has made Russell W. Case, Jr., for the past two years assistant advertising manager, advertising manager to succeed Eugene V. Carlquist, now with the advertising firm of Fuller, Smith & Ross, Cleveland, O.

Rubber Industry in Far East

NETHERLAND INDIA

At a recent meeting of the Semarang Kedoe Planters' Association in Semarang, Java, an interesting lecture on up-to-date rubber planting material was given by F. W. Ostendorf. The clones recommended at present, he said, are still for the most part those derived from mother trees selected from ordinary estate trees. Although the experiment stations have been making artificial crossings on a large scale since 1920, progress, of necessity, has been slow, and the A.V.R.O.S. Experiment Station, for instance, is only now in a position to state that some of the clones from the 1920 crossings promise to rival the best of the so-called estate clones.

Data regarding the older clones, collected both by estates and experiment stations, indicate that certain clones are more susceptible than others to regional differences. This problem is receiving further attention, and in future, advice as to planting material will have to take this tendency into account.

Another problem is the question as to what seedlings are best used as stock. While vigorous stems have been found to exert a favorable influence on the growth of the buddings, the productivity of the former appears to have no effect on yields. Again, the expectation that a clone would give best results if grafted on to related stems, and particularly stems from seed of the clone itself, has not been realized. The other side of the question, that is the effect of the bud on the stock, is also being studied. In this connection tests in high-budding have been initiated to determine the effect of the upper stem on the yield capacity of the under stem, but so far no definite conclusions are possible.

As to seedlings, East Coast of Sumatra now has a number of seedling families which have been tapped for several years and have given yields equal to those of good clones. Similar results have been obtained in Java, but here tapping was carried out for two years at most. For the present, therefore, the advice is still to plant seedlings on a comparatively small scale.

The question as to whether buddings will eventually be superseded by seedlings must still remain unanswered. The latter have the advantage of being easier to plant and to tap and of offering greater possibilities of raising outputs by selective thinning out. The former have the advantage of in themselves representing the ultimate in selection, so to speak. They can be taken from the very highest producers. But the snag is that the clones but imperfectly reproduce the yield capacity of the mother trees.

Native Rubber Question

Before the present restriction plan was adopted, numerous schemes were offered, several of which suggested the destruction by one method or another of a proportion of native rubber. Recently a writer in the *Alg. Landbouwweekblad* came forward with a similar suggestion. He proposed that the government offer natives a premium of 20 guilders for each hectare of rubber trees cut down, with the proviso that the land thus made free be devoted to the production of rice or similar crops.

Pointing to the millions of guilders (about 25,000,000 guilders, it has been calculated,) which have been collected from the special export duty on native rubber, he says that a part might well be diverted from the purposes for which they have been earmarked, as improved irrigation works, and improved roads, etc., to finance such a scheme, and he has no doubt a sufficient number of natives would adopt it. Leaders of the brigades engaged in registering native rubber gardens, he recalls, have from time to time sent letters to various publications from which it is clear that very many of the rubber gardens are of little or no value to owners, so that a premium of 20 guilders would likely induce a large number of owners to cut down their rubber areas. Figuring that the potential output per hectare of native rubber is 400 kilos per annum, the expenditure of 1,000,000 guilders would reduce the potential by 20,000 tons per annum; for 12,000,000 or 13,000,000 guilders the rubber industry could be put on a sound footing again, which would be cheap at the price considering that the government spent around 5,000,000 guilders to buy 20,000 tons of coupons to save the situation temporarily in 1935.

The machinery for carrying out such a project is ready to hand, for the leaders now taking the census of native rubber trees could at the same time be employed to supervise the felling where natives undertake to do this.

PERSIA

The first factory for the production of rubber footwear is to be established in Kasvin, Persia, special permission having been obtained from the Persian Government. It is said local capital has been employed in this venture.

BRITISH NORTH BORNEO

British North Borneo rubber producers have long been dissatisfied with the basic quotas allotted this territory under the rubber restriction scheme, but claims for an increase have been ignored. But now since the revision of the Netherland India quotas, and as they are nearing the end of their resources, the producers have become more insistent. Recently the North Borneo Chambers of Commerce prepared a memorandum setting forth their claims. Under the restriction scheme British North Borneo is allowed basic quotas as follows:

	Tons		
	Permanent Basis	Addition to Permanent Basis	Total
1934.....	6,325	5,475	12,000
1935.....	6,525	6,475	13,000
1936.....	6,525	7,475	14,000
1937.....	6,525	8,975	15,500
1938.....	6,525	9,975	16,500

The figures for the permanent basis were calculated on exports for 1929-1932, which averaged 6,528 tons a year. Calculated on the tappable area this would give an average of 176 pounds an acre. The low figure, it is explained, was due to the fact that less than 50% of the mature area was tapped during the period. Most of the young rubber was left untapped for prolonged periods to reduce tapping costs; for the same reason selective tapping was carried out on many estates, with all low-yielding trees left out of tapping; finally a number of estates stopped tapping altogether for varying periods during 1929-1932. The latter companies stopped tapping from policy and not from lack of capital.

Special consideration should have been given these facts, and the case met by giving British North Borneo an adequate supplementary grant making the permanent basis at least 9,700 tons a year instead of 6,525 tons as at present, although even this higher figure represents only 265 pounds an acre. But on this basis North Borneo's quotas are short a total of 24,100 tons for the period 1934-1938, it is claimed. If the basis of 400 pounds an acre is used, the total shortage comes to 49,800 tons.

It is further pointed out that the increase in the quotas to India, Burma, Siam, and Netherland India involves a cut of 7% in the quota for 1936, whereby North Borneo's quota will be reduced from 14,000 to 13,020 tons.

The data submitted show the total area under rubber at the end of 1934

was 126,640 acres, of which 70,868 acres represented holdings over 100 acres and 55,772 acres, holdings under 100 acres. A total of 62,796 acres were planted from 1925 to 1931 inclusive, of which 2,202 acres were budded. From these figures it appears that budding was first started here in 1926.

INDO-CHINA

According to official statistics, at the end of 1935, 844 plantations in Indo-China had a total area of 125,987 hectares (hectare equals about 2.47 acres). Of these, 783, with a total area of 97,073 hectares, were in Cochin, and 40, with a total area of 27,225 hectares, in Cambodge. Very little rubber is grown in the other provinces. Most of the smaller estates were in Cochin China, while those in Cambodge were among the largest. More than half the total number of estates were under 100 acres in extent, but their acreage aggregated only 6,395 hectares; while more than half the area was under native ownership. Of the 312 larger estates, which covered an area of 119,417 hectares, 55, covering 4,413 hectares, were operated by natives. Unlike Malaya and the Netherland India, therefore, only a small proportion of rubber in Indo-China is produced by natives, their total planted acreage being given as 8,300 hectares. The data further indicate that 31 estates, all European-owned, were over 1,000 hectares in extent. The budded area has increased rapidly and at the end of 1935 came to 43,826.6 hectares, or more than one-third the entire planted acreage. Natives owned 156 acres of the budded rubber in Indo-China.

Tapping in 1935 was carried out on 75,139 hectares; the output was put at 28,108 tons. The area to be tapped in 1936 is put at 93,013 hectares, with estimated output of 36,657 tons; in 1937 it is figured 103,649 hectares will be tapped producing 48,658 tons; and in 1938, 112,876 hectares to obtain a yield of 59,871 tons.

SOUTH AFRICA

Next September, South Africa plans to open its Empire Exhibition at Johannesburg, and the Rubber Growers' Association will participate. It will have a stand demonstrating the use of rubber in general and dairy farming, mining and general engineering, besides new uses for rubber. In a lounge rubber floor covering, mats, and upholstery will be shown; while crepe soled footwear and some uses of latex will be featured also in a special display at the Empire Exhibition.

It is understood a number of important British rubber manufacturers as well as local factories will be represented at the exhibition. One of the local newspapers is said to be planning a special rubber supplement when the exhibition is held.

MALAYA

Sole Crepe Problems

Producers of sole crepe at times receive complaints from consumers in Europe about the resilience and hardness of shipments, and buyers sometimes reject consignments on the ground that they are softer and less resilient than the original sample. However, when these supposedly defective rubbers are tested at the Rubber Research Institute in Malaya, they prove to be normal sole crepe, and when compared with the duplicates of the original samples retained by the producers, they show the same resilience. The reason for the complaints, therefore, was at first obscure. Later, however, Dr. Rhodes, who takes up the matter in the *Journal of the Rubber Research Institute* for December, 1935, had the opportunity of discussing the matter with brokers in London, when it became evident that the clue to the trouble was to be sought in the temperature conditions and time of storage in European warehouses before sale to the user.

Raw rubber stored at a low temperature for several weeks undergoes partial crystallization, rendering it stiff, opaque, and similar to leather in its resistance to bending. But this condition is transitory and changes rapidly when the rubber is kept in a warmer temperature. The user, not being familiar with the effect of temperature variations and having no means of testing the properties of the material, naturally imagines that the tougher and more opaque rubber is superior to that which, because it has not been stored in cold for any period before delivery, is translucent and flexible. In many cases, therefore, the complaints about sole crepe softness are unjustified.

Notes

Recently the foundation stone of the new home of the Rubber Research Institute in Kuala Lumpur was laid. It is possible that work will also shortly be commenced on new buildings for the Department of Agriculture.

Rubber producers should ask for and the governments concerned should agree to the continuance of rubber restriction after 1938, S. B. Palmer, retiring president of the United Planters' Association of Malaya, said at the general meeting of that body.

Various rubber companies report decreased profits during 1935 owing to the higher cost of producing the restricted crop during that year.

Sale of Coupons

Recent figures regarding Malayan outputs show a much greater reduction in native production since restriction than in that from estates. This difference has been explained by some as due to the fact that small holders are more or less under-assessed while the reverse is held to be the case with the estates. Another reason given is that many owners of small holdings prefer to sell their coupons and leave their gardens untapped, while they work as tappers on estates. Such a course is, naturally, bound to have a more or less harmful effect on the employment situation. Tappers, on the one hand, are discharged from the small holdings closed because of the sale of coupons, and on the other, the owners encroach on the number of available jobs as tappers. The advisability of restricting or prohibiting the sale of coupons seems to require careful examination.

Ohio

(*Continued from page* 60)

ating manager and became general credit manager in 1925. He was named secretary-treasurer the next year and continued as such until he was elected to his present post May 24, 1935.

Mr. Morley was born in Lacrosse, Wis., July 28, 1892. He attended elementary and Madison high schools and the University of Wisconsin, graduating from the latter a B.S. in 1915, after having majored in commercial courses.

He is a member of the Canadian Credit Institute and active in the Rotary, Granite, and Flying clubs. His address is 160 John Blvd., Waterloo.

Rubber and Fabric Data

United States exports of rubber and manufactures for the first quarter of 1936 were valued at $5,500,000 against $5,700,000 for the similar period in 1935, $4,700,000 in the first quarter of 1932, and $21,400,000 in the same period in 1929. The 1936 figure represents a 3.8% decline from the 1935 figure, but a 16.1% increase above that of 1932. For automobile casings the first quarter figures follow: 1936, $2,400,000; 1935, $2,600,000; 1932, $2,200,000; 1929, $10,000,000. The 1936 figure is 10.4% below that of 1935, but 6.6% above the 1932 figure. Total automobile casings exported for the same quarters are: 1936, 218,000, 14.5% below the 1935 figure of 255,000 and 8.4% below the 1932 figure of 238,000; 1929, 896,000.

The value of cloth, duck, and tire fabric exported the first three months of 1936 was $5,900,000, 6.2% above the 1935 figure of $5,600,000, but 20.6% below the 1932 figure of $7,400,000. In the first quarter of 1929 the value of these exports reached $23,500,000. The quantity exported was 53,000,000 square yards for the first quarter of 1936, 4.9% above the 1935 figure of 51,000,000 square yards, but 45.6% below the 1932 figure of 98,000,000 square yards. The 1929 figure was 170,000,000 square yards.

The value of crude rubber imported the first quarter of 1936 was $29,100,000, 18.6% below the 1935 figure of $35,700,000, but 177.8% above the 1932 figure of $10,500,000. In 1929 the value of rubber imported the first quarter was $68,000,000.

Patents and Trade Marks

MACHINERY

United States

2,038,736. **Tire Vulcanizer Work Fitter.** J. C. Heintz, Lakewood, O.

2,038,840. **Golf Club Handgrip Affixing Tool.** E. E. Hall, Chicago, Ill.

2,038,880. **Extensible Material Tester.** H. Willshaw, Wylde Green, and G. C. Brentnall, Birmingham, assignors to Dunlop Rubber Co., Ltd., Birmingham, all in England.

2,039,271. **Vulcanizer.** J. M. Bierer, Newton, Mass.

2,039,531. **Telescopic Tire Building Drum.** A. L. Heston, Columbiana, assignor to National Rubber Machinery Co., Akron, both in O.

2,039,532. **Tire Builder.** A. L. Heston, assignor to National Rubber Machinery Co., both of Akron, O.

2,039,626. **Stripper.** P. A. Raiche, Providence, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,039,627. **Bead Wrapper.** W. J. Breth, assignor to General Tire & Rubber Co., both of Akron, O.

2,040,105. **Cord Latexing Apparatus.** N. J. Ritzert, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,040,377. **Die.** L. M. Harley, Brooklyn, N. Y., assignor to James H. Matthews & Co., a corporation of Pa.

2,040,549. **Sheet Rubber Apparatus.** J. R. Gammeter, Akron, O., assignor to United States Rubber Co., New York, N. Y.

2,040,550. **Continuous Strip Material Apparatus.** J. R. Gammeter, Akron, O., assignor to United States Rubber Co., New York, N. Y.

2,040,921. **Shoe Mold.** E. A. Corbin, Jr., Gradyville, assignor ot ½ to W. C. Biddle, Lansdowne, both in Pa.

2,041,321. **Tire Retreader.** J. Brasty, Maple Heights, assignor of ½ to A. R. Meyer, Cleveland, both in O.

Dominion of Canada

357,315. **Thread Conveyer.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of F. S. Mead, Cranston, R. I., U. S. A.

357,433. **Vulcanizer.** Dental Mfg. Co., Ltd., London, assignee of W. G. Lee, Barnet, both in England.

357,441. **Intermittent Cutter.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of G. A. Williamson, High Wycombe, and P. Holmes and J. Blackwood, both of Southall, co-inventors, all in England.

357,525. **Sanitary Pad Shield Apparatus.** A. N. Spanel, Rochester, N. Y., U. S. A.

United Kingdom

440,994. **Tire Builder.** Dunlop Rubber Co., Ltd., London, and H. Willshaw and L. S. Blanchard, both of Birmingham.

441,056. **Boot Vulcanizer.** G. W. Halstead and C. H. R. Collins, both of Huddersfield.

441,478 and 441,616. **Tire Builder.** Dunlop Rubber Co., Ltd., London, and H. Willshaw and L. S. Blanchard, both of Birmingham.

441,622. **Fabric Coater.** British Celanese, Ltd., London.

441,648. **Strip Cutter.** Dunlop Rubber Co., Ltd., London, and H. Willshaw and W. J. Garrison, both of Birmingham.

441,655. **Tire Mold.** Dunlop Rubber Co., Ltd., London, and H. Willshaw, F. G. Broadbent, and J. H. Hardman, all of Birmingham.

441,850. **Rubber Powder Apparatus.** A. Thorp, Pluckley.

Germany

629,819. **Rubber Strip Cutter and Joiner.** Deutsche Dunlop Gummi-Co., A.G., Hanau a.M.

629,971. **Dipping Molds.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. Wiegand, Berlin.

PROCESS

United States

2,038,548, 2,038,549, 2,038,550, and 2,038,551. **Coating Metal.** E. C. Domm, assignor to National-Standard Co., both of Niles, Mich.

2,038,672. **Attaching Rubber Heels to Shoes.** G. O'Gorman, Boston, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,039,067, 2,039,068, and 2,039,069. **Rubber Adherent Article.** E. C. Domm, assignor to National-Standard Co., both of Niles, Mich.

2,039,191. **Rubber Derivatives.** P. Schidrowitz and C. A. Redfarn, assignors to Rubber Producers Research Asso., all of London, England.

2,039,386. **Rubber Product.** A. J. Borst, Jr., Buffalo, N. Y.

2,039,931 and 2,039,932. **Hosiery.** C. A. Riggs, Chattanooga, Tenn., assignor of ¼ to N. Levin, Trenton, N. J., and 3/10 to Margate Hosiery Mills, Inc., Chattanooga, Tenn.

2,039,977. **Insulation.** C. F. Obermaier, York, Pa., assignor to General Electric Co., a corporation of N. Y.

2,040,256. **Filling Material.** F. R. Grant, Champaign, assignor to Board of Trustees of the University of Illinois, Urbana, both in Ill.

2,040,608. **Moistureproof Material.** W. J. H. Hinrichs, Hamburg, Germany.

2,041,356. **Matting.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,041,357. **Non-Metallic Container.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,041,520. **Squeezing Bowl.** D. Bamford, Middleton, England.

Dominion of Canada

357,969. **Ornamented Knitted Fabric.** Narrow Fabric Co., W. Reading, assignee of Berkshire Knitting Mills, assignee of M. Krissiep, both of Wyomissing, all in Pa., U. S. A.

United Kingdom

440,755. **Knitted Fabric.** R. Pickles, Ltd., Burnley, and L. J. Lepine, Southport.

441,002. **Elastic Fabric.** T. L. Shepherd, London.

441,124. **Rubber Thread.** T. L. Shepherd, London.

441,253. **Prevulcanization Coating.** E. Sachs, Berlin, Germany.

441,440. **Rubber Thread.** H. Ziegner, Hagen, Germany.

441,465. **Rubber Thread.** T. L. Shepherd, London.

441,502. **Coating Tire Bead Wires.** A. H. Stevens, London. (National-Standard Co., Niles, Mich., U. S. A.)

441,651. **Molding Sandal Soles.** Hertfordshire Rubber Co., Ltd., and G. Entwisle, both of Letchworth.

441,799. **Rubber Thread.** A. H. Stevens, London. (B. F. Goodrich Co., New York, N. Y., U. S. A.)

442,136. **Treating Rubber Dispersions.** Rubber Producers Research Asso., and H. P. Stevens, both of London.

442,143. **Ornamented Mat.** Redfern's Rubber Works, Ltd., Hyde, and J. H. Coffey, Rhos-on-Sea.

442,219. **Bandage.** D. Sarason, Suna di Pallanza, Italy.

CHEMICAL

United States

2,038,556. **Liquid Composition.** C. Ellis, Montclair, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,038,709. **Stabilized Acid Latex.** H. J. Billings, Acton, assignor to Arthur D. Little, Inc., Cambridge, both in Mass.

2,039,112. **Rubber Distillate Purification.** F. N. Pickett, London, England, assignor to United States Rubber Products, Inc., New York, N. Y.

2,039,206. **Elastic Caoutchouc - Like Body.** J. Baer, Uster, Switzerland.

2,039,238. **Rubber Condensation Derivative.** H. R. Thies, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,040,314. **Rubber Treatment.** A. R. Kemp, Westwood, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,040,460. **Rubber Conversion Product.** W. Becker, Cologne-Mulheim, L. Orthner, Leverkusen-I. G. Werk, and A. Blömer, Imbach, assignors to I. G. Farbenindustrie A. G., Frankfurt a. M., all in Germany.

2,040,467. **Accelerator.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,040,490 and 2,040,491. **Antioxidant.** W. M. Lauter, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,040,698. **Improved Vulcanized Rubber.** R. R. Lewis, Baldwin, and A. J.

Weiss, Mineola, assignors to Vulcan Proofing Co., New York, all in N. Y.

2,040,770. **Carbon Black.** H. W. Grote, Charleston, W. Va., assignor to United Carbon Co., Inc., Baltimore, Md.

2,041,217. **Plastic Composition.** V. L. Smithers, Akron, O., and H. A. Winkelmann, Chicago, Ill.

2,041,223. **Plastic Rubber Composition.** R. R. Bollman, Mt. Washington, assignor to Perfect Mfg. Co., Cincinnati, both in O.

2,041,305. **Vulcanizable Material.** M. J. Stam, The Hague, Netherlands.

Dominion of Canada

357,281. **Antioxidant.** Canadian Industries, Ltd., Montreal, P. Q., assignee of I. Williams, Penns Grove, N. J., U. S. A.

357,437. **Non-Permeable Coating.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of A. E. T. Neale, E. W. B. Owen, J. A. Wilson, and D. F. Twiss, co-inventors, all of Birmingham, England.

357,695. **Antioxidant.** R. T. Vanderbilt Co., Inc., New York, assignee of A. A. Somerville, Flushing, both in N. Y., U. S. A.

357,821. **Moistureproofing Cellulosic Material.** British "New-Wrap" Co., Ltd., Manchester, assignee of M. F. Monbiot, London, both in England.

358,027. **Rubber Regeneration.** B. G. Calise, Paris, France.

United Kingdom

440,767. **Coating Composition.** British Celanese, Ltd., London.

440,924. **Synthetic Resin.** British Thomson-Houston Co., Ltd., London.

440,983. **Coloring Rubber.** Imperial Chemical Industries, Ltd., London, and C. Child and H. A. Thomas, both of Manchester.

441,064. **Rubber-Like Mass.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)

441,083. **Can Sealing Composition.** Crosse & Blackwell, Ltd., W. Clayton, and R. I. Johnson, all of London.

441,091. **Rubber Color.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)

441,384. **Plastic Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

441,391. **Rubber Composition.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.

441,447. **Filament Spinning Solution.** R. Pickles, Burnley, and J. Pickles, Fence.

441,457. **Accelerator.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.

441,477. **Treating Textiles.** A. Skipsey, St. Albans.

441,653. **Accelerator.** Dunlop Rubber Co., Ltd., London, and D. F. Twiss, F. A. Jones, and D. J. Hadley, all of Birmingham.

441,669. **Coating Composition.** J. R. Geigy A. G., Basle, Switzerland.

441,765. **Cement - Latex Composition.** A. E. Bond, Ilford, and J. T. K. Crossfield, London.

441,877. **Jar Sealing Composition.** Crosse & Blackwell, Ltd., W. Clayton, and R. I. Johnson, all of London.

441,912. **Plasticizer.** Beck, Koller & Co., Inc., assignee of A. G. Hovey, both of Detroit, Mich., U. S. A.

441,939. **Linoleum Adhesive Backing Composition.** A. H. Stevens, London. (Congoleum-Nairn, Inc., Kearny, N. J., U. S. A.)

441,988. **Wound Plaster.** Sander's Chemical Products, Ltd., Loughborough. (E. Sander, Munich, Germany.)

442,001. **Antioxidant.** Wingfoot Corp., Wilmington, Del., U. S. A.

442,087. **Latex Composition.** Kolnische Gummifaden-Fabrik Vorm. F. Kohlstadt & Co., Cologne, Germany.

442,212. **Rubber Composition.** Hanseatische Muhlenwerke A. G., Hamburg, Germany.

442,287. **Plastic Composition.** H. Stossel, Berlin, Germany.

442,304. **Latex Thread Composition.** W. Warne & Co., Ltd., Barking, and J. P. Griffiths, C. R. Pinnell, and F. R. Gladstone, all of London.

442,494. **Insecticide.** Kerasin, Ltd., Zug, Switzerland.

Germany

629,714. **Sponge Rubber.** L. E. Howard, London, England. Represented by G. Lotterhos, Frankfurt a.M.

630,037. **Latex Concentrates.** Metallgesellschaft A.G., Frankfurt a.M.

630,126. **Rubber Vulcanizates.** Dubois & Kaufmann G.m.b.H., Mannheim-Rheinau.

630,144. **Dispersions.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. Wiegand, Berlin.

GENERAL

United States

2,038,527. **Polished Rod Shock Absorber.** J. F. Eaton, assignor to Engineering Co., both of Tulsa, Okla.

2,038,561. **Coater.** J. B. Hadaway, Swampscott, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

2,038,606. **Detachable Layer Heel.** L. S. Sarkadi and C. E. Crowley, both of New York, N. Y.

2,038,637 and 2,038,638. **Drain Board Binding.** E. E. Brey, Pittsburgh, Pa., assignor to Tracy Mfg. Co., a corporation of Pa.

2,038,680. **Shock Absorber.** J. B. Rieker, Akron, O.

2,038,698. **Hat Cleaner.** G. Wolkenhauer, assignor to Robert Britigan Corp., both of Chicago, Ill.

2,038,712. **Wet Fibrous Material Dehydrater.** C. F. Brodin, Stockholm, Sweden.

2,038,858. **Stopper.** H. M. Sacks, assignor to General Health Corp., both of Philadelphia, Pa.

2,038,875. **Hat.** H. Siegelbaum, assignor to Dalton Hat Co., both of Yonkers, N. Y.

2,038,937. **Molding Blanket.** M. F. Jacobs, Akron, O.

2,038,968. **Engine Mounting.** C. E. Summers, Pontiac, assignor to General Motors Corp., Detroit, Mich.

2,038,972. **Sole.** C. Watanabe, Los Angeles, Calif.

2,038,989. **Refrigerator.** R. F. Castle, Kansas City, Mo., assignor, by mesne assignments, to Sealzit Corp., a corporation of Ill.

2,038,990. **Refrigerator Seal.** C. O. Barr, assignor to Sealzit Corp., both of Chicago, Ill.

2,038,991. **Refrigerator Seal.** I. L. Wise, assignor to Sealzit Corp., both of Chicago, Ill.

2,039,005. **Spare Tire Cover.** H. S. Jandus and A. P. Fergueson, assignors to Lyon Cover Co., all of Detroit, Mich.

2,039,007. **Engine Mounting.** J. H. Keller, Pontiac, assignor to General Motors Corp., Detroit, both in Mich.

2,039,009. **Grommet.** G. W. Lampman and G. F. Cooper, both of Pontiac, assignors to General Motors Corp., Detroit, all in Mich.

2,039,091 and 2,039,092. **Rail Vehicle Tire.** J. Ledwinka, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,039,153. **Roller Skate.** G. N. Edwards, assignor to Ohio Rubber Co., both of Willoughby, O.

2,039,158. **Mattress Assembling Table.** A. J. Flynn, Toronto, Ont., Canada.

2,039,180. **Massager.** J. J. Mendenhall, Jacksonville, Fla.

2,039,210. **Axle.** E. Bugatti, Molsheim, France.

2,039,229. **Film Former.** E. M. Kratz, Gary, Ind., assignor, by mesne assignments, to Marbo Products Corp., Chicago, Ill.

2,039,234. **Respiratory Mask.** R. Malcom, Chicago, Ill.

2,039,258. **Vulcanizing Pad.** J. M. Patterson, Waban, Mass.

2,039,284. **Veneering Tape.** R. N. Hartzell, assignor to Hartzell Industries, Inc., both of Piqua, O.

2,039,289. **Mattress.** R. Bergeron, St.-Paulin, assignor of ½ to J. McMurray, St.-Alexis des Monts, both in P. Q., Canada.

2,039,343. **Inner Tube.** M. Prokul, Maplewood, N. J.

2,039,373. **Nurser.** M. Wittmann, New York, N. Y.

2,039,394. **Tree Ornament.** E. C. Dalton, Nashville, Tenn.

2,039,401. **Automatic Sealer.** G. Foges, Prague, Czechoslovakia.

2,039,419. **Elastic Tulle Fabric.** A. Isaac, Lyon, assignor to Dognin-Société Anonyme, Villeurbanne, both in France.

2,039,421. **Milker.** E. T. Jansson, Stockholm, Sweden, assignor to De Laval Separator Co., New York, N. Y.

2,039,461. **V-Belt Slip-On Band.** J. L. Sparling, Bay City, Mich., assignor of ½ to E. W. Sims, Chicago, Ill.

2,039,475. **Conductor.** J. W. Campbell, Los Angeles, Calif.

2,039,476. **Overshoe.** E. W. Dunbar, Hudson, assignor to Cambridge Rubber Co., Cambridge, both in Mass.

2,039,498. **Rail Vehicle Tire.** J. P. Tarbox, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,039,505. **Finger Protector.** W. P. Vollmer, Wilton, Conn.

2,039,521. **Tractor Lug.** G. R. Cunnington, assignor to General Tire & Rubber Co., both of Akron, O.

2,039,529. **Rubber Product.** R. H. Guinzburg, Flushing, assignor to I. B. Kleinert Rubber Co., New York, both in N. Y.

2,039,608. **Land and Water Vehicle.** A. Ruzicka, Chicago, Ill.

2,039,620. **Towel Holder.** J. S. Bear, assignor of ⅓ to E. Schreiber, both of Detroit, Mich.

2,039,638. **Air Inflater.** D. O. and O. C. Druge, both of Oakland, Calif.

2,039,670 and 2,039,671. **Wheel Axle**

Suspension. M. Wagner, Stuttgart, assignor to Daimler-Benz A. G., Stuttgart-Unterturkheim, both in Germany.

2,039,716. **Windshield Wiper.** E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.

2,039,723. **Shoe Shank and Sole Buffer.** P. Lauretti, assignor to C. A. Wardecker, both of Carlisle, Pa.

2,039,726 and 2,039,727. **Rail Vehicle Tire.** J. Ledwinka, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,039,759. **Snubber Spring.** E. W. Webb, assignor to Standard Car Truck Co., both of Chicago, Ill.

2,039,767. **Insole.** F. Bilodeau, Montreal, P. Q., Canada.

2,039,792. **Drain Cleaner.** J. W. Harder, assignor of ⅝ to P. H. Marsh, both of Sioux City, Iowa.

2,039,868. **Shoe Press Heater.** S. Zukowski, Duluth, Minn.

2,039,884. **Suspenders.** K. Chase, E. Walpole, assignor to George Frost Co., Boston, both in Mass.

2,039,887. **Waterproof Purse.** J. J. Colletti, Saranac Lake, N. Y.

2,039,918. **Toy.** L. D. Miller, assignor to Lee-Tex Rubber Products Corp., both of Chicago, Ill.

2,039,954. **Heel and Hose Protector.** C. J. Fricker, assignor of 30% to G. H. Callaghan, both of New York, N. Y., and 10% to D. P. Moore, Avon Park, Fla.

2,039,987. **Umbrella.** H. Goldman, Chicago, Ill.

2,039,996. **Electrical Connector.** A. C. Hessel, assignor to W. F. Hessel Co., Inc., both of New York, N. Y.

2,040,001. **Sole Patch.** E. G. Jones, Hutchinson, Kan.

2,040,058. **Lockstitch Knit Fabric.** W. Mendel, Beverly, and J. Titone, Burlington, assignors to Neidich Cel-Lus-Tra Corp., Burlington, all in N. J.

2,040,114. **Fruit Juice Extractor.** H. F. Watkins, Oakland, assignor to Watkins Fruit Machinery Co., San Francisco, both in Calif.

2,040,201. **Doll.** A. Cohen, Brooklyn, N. Y.

2,040,255. **Electric Battery.** C. J. Gordon, London, England.

2,040,299. **Tire Inflater and Gage.** D. O. and O. C. Druge, both of Oakland, Calif.

2,040,320. **Shoe Stiffener.** S. P. Lovell, Newton, Mass., assignor, by mesne assignments, to Beckwith Mfg. Co., Dover, N. H.

2,040,356. **Valve.** H. J. Butcher, assignor to Leyland & Birmingham Rubber Co., Ltd., both of Leyland, England.

2,040,375. **Pressure Alarm.** G. G. Guthrie, Tulsa, Okla.

2,040,398. **Foundation Garment.** M. A. Nathanson, assignor to A. M. Nathanson, both of Brookline, Mass.

2,040,411. **Bowed Expander Roll.** C. W. Shute, Hyde Park, assignor to F. T. Walsh, doing business as Thomas Leyland Machinery Co., Boston, both in Mass.

2,040,424. **Typewriter.** R. E. Benner, Buffalo, assignor to Remington Typewriter Co., Ilion, both in N. Y.

2,040,456. **Headwear.** P. Adamson, Rye, assignor to United States Rubber Co., New York, both in N. Y.

2,040,466. **Universal Clamp.** W. O. Christy, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,040,521. **Toy Gasoline Station.** L. Marx, New York, N. Y.

2,040,522. **Toy.** L. Marx, New York, N. Y.

2,040,547. **Thermohydrometer.** H. W. Eden, Chicago, Ill., assignor to Triple-A-Specialty Co., a corporation of Ill.

2,040,554. **Tire Pressure Switch.** S. V. Holmes, assignor of ½ to E. J. Radlein, both of St. Paul, Minn.

2,040,560. **Warp Fabric.** E. R. Meinig, Wyomissing, Pa.

2,040,561. **Undergarment.** E. R. Meinig, Reading, Pa.

2,040,562. **Knee-Length Stocking.** E. R. Meinig, Reading Pa.

2,040,589. **Vehicle Wheel.** W. L. Avery, Thorley, England.

2,040,603. **Musical Instrument Hammer.** W. D. Gladstone, New York, N. Y.

2,040,616. **Collapsible Life Boat.** D. Mapes, Upper Montclair, N. J., assignor to Walter Kidde & Co., Inc., New York, N. Y.

2,040,635. **Garter.** A. J. Sobel, Brooklyn, N. Y.

2,040,645. **Non-Collapsible Tire.** F. S. Dickinson, New York, N. Y.

2,040,657. **Corset.** W. and S. D. Kops, assignors to Kops Brothers, Inc., all of New York, N. Y.

2,040,659. **Mop Dust Bouncer.** G. S. Leiner, New Rochelle, and C. A. Bernstein, New York, both in N. Y.

2,040,696. **Tractor Track.** E. A. Johnston, Chicago, Ill., assignor to International Harvester Co., a corporation of N. J.

2,040,736. **Hosiery Top Construction.** J. A. Goodman, Indianapolis, Ind.

2,040,757. **Nursing Bottle Holder.** N. S. Murphy, Orlando, Fla.

2,040,759. **Tire.** W. D. Nore, Pitcairn, Pa.

2,040,798. **Telltale Jar Closure.** C. Schoonmaker, New York, N. Y.

2,040,810. **Corset.** M. Kahn, Cedarhurst, N. Y.

2,040,834. **Flexible Conduit.** I. Cowles, Detroit, Mich.

2,040,868. **Tire Inflater.** K. M. Moody, Chicago, Ill.

2,040,891. **Tire Pressure Indicator.** H. Wright, San Diego, Calif., and H. Hemperly, Phoenix, Ariz.

2,040,986. **Door Shock Absorber.** F. E. Gignoux, Cape Elizabeth, Me.

2,040,999. **Fountain Pen.** L. A. Kelley, assignor to Conklin Pen Co., both of Toledo, O.

2,041,032. **Safety Tread.** E. Van der Pyl, Holden, assignor to Norton Co., Worcester, both in Mass.

2,041,066. **Breast Supporter.** P. Howard, Alameda, Calif.

2,041,077. **Dental Drill Hand Piece Protector.** A. M. Lininger, Englewood, Colo.

2,041,190. **Dispenser.** D. D. Kuhlke, Akron, O.

2,041,262. **Teeth and Gum Massager and Cleanser.** E. L. Ness, Minneapolis, Minn.

2,041,269. **Electrical Conductor.** W. S. Smith, Benchams, H. J. Garnett, Lymne, and J. N. Dean, Orpington, all in England.

2,041,353. **Shockless Mounting.** M. W. Kenney, Chicago, and A. R. Constantine, River Forest, assignors to General Household Utilities Co., Chicago, all in Ill.

2,041,391. **Bottle Opener and Sealer.** G. J. Bauch, Milwaukee, Wis.

2,041,424. **Pessary.** W. K. McCormick, Walkerville, and M. A. Stein, Windsor, both in Ont., Canada.

2,041,490. **Railroad Car Wheel.** A. L. Runyan, assignor of ½ to L. H. Scurlock, both of Chicago, Ill.

2,041,496. **Coated Sheet Material.** S. D. Shinkle, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,041,499. **Rubber Type Holder and Type Therefor.** J. R. Swift and R. W. Redin, both of Chicago, Ill.

2,041,507. **Fan and Vibration Damper.** J. C. Zeder, assignor to Chrysler Corp., both of Detroit, Mich.

2,041,515. **Liquid Bag.** A. Richards, Providence, R. I.

2,041,534. **Inner Tube.** E. Eger, Grosse Pointe Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,041,538. **Horseshoe.** G. Gash, Balaclava, and C. M. Godby, Caulfield, both in Victoria, Australia.

2,041,555. **Fan and Vibration Damper.** R. K. Lee, Highland Park, assignor to Chrysler Corp., Detroit, both in Mich.

2,041,556. **Vibration Damper.** R. K. Lee, assignor to Chrysler Corp., both of Detroit, Mich.

2,041,664. **Lockstitch Knit Fabric.** W. Mendel, Beverly, and J. Titone, Riverbank, assignors to Neidich Cel-Lus-Tra Corp., Burlington, all in N. J.

2,041,670. **Nurser.** P. E. Young, Fairhaven, Mass., assignor to Acushnet Process Co., a corporation of Mass.

Dominion of Canada

357,394. **Concrete Form Clamp.** E. P. Muntz, Hamilton, Ont.

357,411. **Conveyer.** Bancroft Holdings, Ltd., Hamilton, assignee of H. S. Johns, No. Grimsby, both in Ont.

357,431. **Centrifuge Packing.** De Laval Separator Co., New York, N. Y., U. S. A., assignee of H. O. Lindgren, Appelviken, Sweden.

357,448. **Footwear.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of P. Klein, Budapest, Hungary.

357,528. **Windshield Heater.** M. Zaiger, Lynn, Mass., U. S. A.

357,565. **Vehicle Chassis.** S. T. Liem, The Hague, Netherlands.

357,567. **Necktie.** J. G. Maheux, Quebec, P. Q.

357,631. **Container.** General Tire & Rubber Co., assignee of H. T. Kraft, both of Akron, O., U. S. A.

357,675. **Aesthetic Belt.** G. Potvin, Ste.-Anne de la Pocatière, assignee of J. A. Caron, Deniau, both in P. Q.

357,725. **Window.** S. W. Funk, Charter Oak, Calif., U. S. A.

357,731. **Railway Car Wheel.** A. Huguenin, Zurich, Switzerland.

357,732. **Pool Table.** T. J. Jones, Winnipeg, Man.

357,734. **Horseshoe.** W. P. Kearney, Brooklyn, N. Y., U. S. A.

357,737. **Liquid Dispenser.** F. Lobl, Middleboro, Mass., U. S. A.

357,773. **Fastener.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. T. Manville, Woodbury, Conn., U. S. A.

357,784. **Fastener.** Lightning Fastener Co., Ltd., St. Catharines, Ont., assignee of H. E. Sipe, New York, N. Y., U. S. A.

357,840. **Water Bag.** W. B. Osborne, Portland, Ore., U. S. A.

357,842. **Swimming Belt.** F. Schick, Montreal, P. Q.
357,924. **Rail Vehicle Tire.** Edward G. Budd Mfg. Co., assignee of E. G. Budd, Philadelphia, Pa., U. S. A.
357,950. **Elastic Knitted Fabric.** Granby Elastic Web, Ltd., Granby, P. Q., assignee of Charles Walton & Son, Inc., Needham Heights, assignee of E. A. Morton, Arlington, administrator of the estate of O. H. Walton, deceased, Needham Heights, all in Mass., U. S. A.
357,951. **Elastic Knitted Fabric.** Granby Elastic Web, Ltd., assignee of P. H. Boivin, both of Granby, P. Q.
357,986. **Tumbler Cap.** White Cap Co., Chicago, assignee of W. P. White, Glencoe, both in Ill., U. S. A.
357,987. **Bottle Cap.** White Cap Co., Chicago, assignee of W. P. White, Glencoe, both in Ill., U. S. A.
358,017. **Golf Club Grip.** A. G. Spalding & Bros. (Canada), Ltd., Brantford, Ont., assignee of J. V. East, Chicopee, Mass., U. S. A.
358,042. **Aircraft.** H. F. Krug, Grosse Pointe Park, Mich., U. S. A.
358,055. **Police Club.** B. Schultz, Atlantic Highlands, N. J., U. S. A.

United Kingdom

440,020. **Index Tab.** E. Johnson, Oslo, Norway.
440,198. **Airplane Structural Part Tester.** J. Bugatti, Molsheim, France.
440,284. **Saddle.** Dunlop Rubber Co., Ltd., London, and G. J. Livings, Manchester.
440,398. **Footwear.** Calzatura Aerata Medusa Soc. Anon., Castellanza, Italy.
440,503. **Exerciser.** L. M. Jacks, London.
440,527. **Bathing Cap.** F. Brighten, London.
440,565. **Inner Tube.** J. Hedley, Durban, and L. Berman, Johannesburg, both in South Africa.
440,618. **Wheel.** W. Ravestein, Monster, Holland.
440,620. **Vehicle Framework.** E. Gretler, Lausanne, Switzerland.
440,725. **Railway Vehicle Buffer and Draw-Gear.** R. T. Glascodine and G. Spencer Moulton & Co., Ltd., both of Westminster.
440,925. **Spring.** Soc. Italiana Pirelli, Milan, Italy.
441,036. **Projecting Appliance.** Dunlop Rubber Co., Ltd., London, and H. F. L. Jenkins and S. G. Ball, both of Birmingham.
441,069. **Elastic Knitted Fabric.** C. Clutson and J. E. Broome, both of Market Harborough.
441,073. **Railway Rail Support.** M. Kahn, Riehl, Germany.
441,200. **Shoot.** J. C. Ward and Milford Docks Co., Milford Haven.
441,222. **Tire Pressure Gage.** W. Turner, Sheffield.
441,239. **Mat.** K. H. Hacklander, Vaduz, Liechtenstein.
441,292. **Hot Water Bottle Valve.** Leyland & Birmingham Rubber Co., Ltd., and H. J. Butcher, both of Leyland.
441,351. **Percussive Drill.** Pyrene Co., Ltd., and J. N. Hunter, both of Brentford.
441,352. **Wheel.** E. Rimailho, Paris, France.
441,355. **Waterproof Fabric.** Siemens-Schuckertwerke A. G., Berlin, Germany.
441,385. **Motor Support.** Watkins & Watson, Ltd., and F. E. M. Ducker, both of London.
441,397. **Garter.** M. H. Myers, Lancaster.
441,423. **Envelope.** W. E. Ellens, Berkhampsted, and J. Dickinson & Co., Ltd., Hemel Hempstead.
441,427. **Tire.** N. H. Astley, Coventry.
441,584. **Hair Curler.** A. A. Coakley, London.
441,630. **Personal Wear Belt.** Armalines, Ltd., and W. E. Cox, London.
441,656. **Rail Vehicle Tire.** Dunlop Rubber Co., Ltd., London, and W. E. Hardeman and R. F. Daw, both of Birmingham.
441,672. **Atomizer.** J. Veissiere, Paris, France.
441,695. **Tire Pressure Gage.** J. G. Bingham, Bexhill-on-Sea.
441,737. **Valve.** W. H. Flood, Sheffield.
441,843. **Motor Mounting.** S. Smith, Chobham.
441,962. **Hat.** C. Eagel, London.
441,981. **Paving Block.** E. Lord, Welwyn Garden City, and W. K. Webster, Weybridge.

Germany

629,780. **Rubberized Removal Linings for Centrifugal Machines.** J. E. Naeher A.G., Chemnitz.
629,892. **Elastic Fabric.** Hch. Kalbskopf A.G., Munchberg, Bavaria.
630,418. **Hollow Cylinder Brake.** Palmer Tire, Ltd., London, England. Represented by E. Meissner and H. Tischer, both of Berlin.
630,561. **Tubeless Pneumatic Tire Closure.** F. Kuhne, Dresden.
630,562. **Solid Tire.** C. E. Veil-Picard, Levallois-Perret, Seine, France. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M., and T. R. Koehnhorn, Berlin.
630,887. **Doll.** Ungarische Gummiwaarenfabriks A.G., Budapest, Hungary. Represented by J. Reitstotter, Berlin.

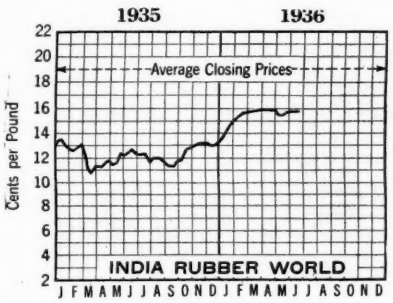
TRADE MARKS

United States

334,277. **Gem.** Sanitary belts. I. B. Kleinert Rubber Co., New York, N. Y.
334,315. **Sportland.** Sport goods, including tennis and golf balls, etc. Kelley-How-Thomson Co., Duluth, Minn.
334,385. **Endurance.** Spark plugs and storage batteries. Western Tire & Rubber Co., Cicero, Ill., now by judicial change of name to Western Tire & Auto Stores, Inc.
334,458. **Sleepy Tot.** Dolls. Paragon Rubber Corp., New York, N. Y.
334,489. Representation of a cross and below it, the words: **"Green Cross."** Adhesive tape. Butler Bros., Chicago, Ill.
334,558. **Smartair.** Men's and boys' suits, trousers, and slacks. Chicago Rubber Clothing Co., Racine, Wis.
334,617. **Contour-Mat.** Automobile floor mats and floor coverings. Paine & Williams Co., Cleveland, O.
334,668. **Play-Tex.** Bathing caps. International Latex Corp., Rochester, N. Y.
334,697. **Dab-it!** Adhesive products. I. L. Slomon, Long Island City, N. Y.
334,720. Label containing the words: **"True Value."** Tires and tubes. Hibbard, Spencer, Bartlett & Co., Chicago, Ill.
334,732. **"Marvelite."** Dress shields. A. Stein & Co., Chicago, Ill.
334,733. **Tultex.** Elastic yarn fabric. Lace Net Importing Co., Inc., New York, N. Y.
334,736. **Supergrip.** Boot and shoe adhesive cement. Boston Blacking & Chemical Co., Boston, Mass.
334,796. **Centipede.** Tires. United States Rubber Products, Inc., New York, N. Y.
334,797. **De-skidded.** Tires. United States Rubber Products, Inc., New York, N. Y.
334,815. Representation of a mountain and below it, the word: **"Edmont."** Gloves, aprons, and mittens. Edmont Mfg. Co., Coshocton, O.
334,946. **Binky.** Teething rings, pacifiers, and nipples. J. Cohn, New York, N. Y.
334,963. Representation of a pyramid and on it the words: **"Built Like the Pyramids."** Tires, inner tubes, fan belts, tire and tube patches, and repair kits and flaps. Associated Rubber Corp., New York, N. Y.
334,964. **Formflex.** Sanitary belts. Venus Corp., New York, N. Y.
335,011. **Squee-Wash.** Squeegees. Squee-Wash Mfg. Co., Niles, Mich.
335,013. Horizontal strip containing the word: **"Gulfco."** Hose. L. J. Langdon, doing business as Gulf Supply Co., Houston, Tex.
335,043. **Natex.** Closure liner disks. Crown Cork & Seal Co., Inc., Baltimore, Md.
335,115. **E-A-K.** Rubber compounding chemical, etc. Tennessee Eastman Corp., Kingsport, Tenn.
335,173. **Amerite.** Aqueous rubber dispersions containing rubber compounding materials. American Anode, Inc., Wilmington, Del.
335,204. **Vulcacement.** Adhesive compositions. Dewey & Almy Chemical Co., Cambridge, Mass.
335,237. **CNX.** Bare and insulated wires and cables. General Cable Corp., New York, N. Y.
335,253. **Posture-ade.** Brassieres, corsets, girdles, bandeaux, and foundation garments. Merkin, Inc., Boston, Mass.
335,274. Label containing the words: **"The Tops."** Raincoats. Sherman Bros. Rainwear Corp., New York, N. Y.
335,320. Representation of a girl swinging from a trapeze; the word: **"Swingy"** forming the horizontal bar of the trapeze. Corsets, girdles, brassieres, bandeaux, etc. Fashion Brassiere Co., Inc., New York, N. Y.
335,322. Fanciful design containing the words: **"Bestlyne Foundations."** Corsets, girdles, brassieres, bandeaux. Bestlyne Foundations Co., New York, N. Y.
335,354. **Rainbeaus.** Footwear. Firestone Footwear Co., Hudson, Mass., assignor to United States Rubber Products, Inc., New York, N. Y.
335,379. Representation of a printer's blanket. Printer's blankets. Behr-Manning Corp., Troy, N. Y.
335,380. **Correct Balance.** Heels. J. Pietzuch, Glendale, Calif.
335,389. **Formaster.** Foundation garments, corsets, girdles, etc. L. Brill, doing business as Brill Corset Co., Philadelphia, Pa.
335,460. **Pulvatex.** Rubber in any form. Rubber-Latex-Poeder Cie. N. V., The Hague, Netherlands.
335,469. Geometrical design above which are the words: **"Round 'N Round."** Bandeaux and foundation garments. Lewel Mfg. Co., Inc., New York, N. Y.

Market Reviews

CRUDE RUBBER



New York Outside Market—Spot Ribbed Smoked Sheets

New York Quotations

New York outside market rubber quotations in cents per pound

	June 25, 1935	May 27, 1936	June 27, 1936
Paras			
Upriver fine	9 5/8	17 1/4	17 1/2
Upriver fine	*12 5/8	*21 3/4	*22 1/4
Upriver coarse	7 1/2	11 1/2	11 3/4
Upriver coarse	*11	*16 3/4	*16 3/4
Islands fine	10 1/2	18	18 1/4
Islands fine	*12 1/2	*21 3/4	*22 1/2
Acre, Bolivian fine	9 3/4	17 1/2	17 3/4
Acre, Bolivian fine	*13	*21 3/4	*22 1/2
Beni, Bolivian	10	18 1/2	18 3/4
Madeira fine	9 5/8	17 1/4	17 1/2
Caucho			
Upper ball	7 1/2	11 1/2	11 3/4
Upper ball	*11	*16 1/2	*16 3/4
Lower ball	7	11 1/4	11 1/2
Pontianak			
Bandjermasin	6	6	6 1/2
Pressed block	11 1/2	12	12 1/2
Sarawak	6	6	6 1/2
Guayule			
Duro, washed and dried	12	13	13 1/2
Ampar	13	13 1/2	14
Africans			
Rio Nuñez	..	14 1/2	14 3/8
Black Kassai	..	14 1/2	14 1/2
Prime Niger flake	..	27	27
Gutta Percha			
Gutta Siak	11	11	11
Gutta Soh	13	14	12 3/4
Red Macassar	1.30	1.25	1.10
Balata			
Block, Ciudad Bolivar	30	30	27
Manaos block	27	27	25
Surinam sheets	36	33	33
Amber	38	36	34

*Washed and dried crepe. Shipments from Brazil.

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	May 2	May 30	June 6	June 13	June 20
May	15.74	.....	.....	.....	.....
June	15.78	15.58	15.62	15.59	15.84
July	15.82	15.61	15.66	15.63	15.88
Sept.	15.91	15.71	15.76	15.72	15.98
Dec.	16.00	15.81	15.86	15.80	16.09
Mar.	16.11	15.92	15.96	15.91	16.17
May	.....	.....	16.04	15.99	16.26
Volume per week (tons)	11,450	3,290	4,630	7,630	6,730

THE data of the above table show the price trend of representative future contracts during approximately the last two months.

Prices of No. 1 smoked sheet futures during the first half of June held fairly steady with firm undertone, suddenly declined on the fifteenth because of news that the freight rate from Singapore had been reduced 1/8¢ a pound. Similar reduction in the freight rate from Batavia, Java, was announced June 18 to meet Singapore competition. Prices subsequently regained their losses, becoming firm, and on June 27 spot touched 16¢ in an active market.

In the first five months of this year rubber consumption in the United States reached a total of 230,334 tons, or a monthly average of 46,067 tons. This exceeds the peak consumption of 44,985 tons reached in 1929. The consumption for May this year was 50,482 tons, the third largest monthly total on record, exceeded only by all-time April peak consumption of 51,897 tons and the June, 1933, total of 50,743 tons.

New York Outside Market

Prices in the outside market for spot ribbed smoked sheets continued to hold very steady in June as for many weeks previous, ranging fractionally upward to an average a little above 15¾¢.

Crude rubber stocks in the United States which were at 303,000 tons at the beginning of this year were reported at 248,317 tons on May 31, a decline of 54,683 tons. Consumption for May is estimated at 50,482 tons, a decrease of 2.7% under April consumption.

Week-end closing prices on No. 1 ribbed smoked sheets for the past several weeks follow: May 2, 15 13/16¢; May 9, 15 3/8; May 16, 15 3/4; May 23, 15 3/4; May 30, 15 5/8; June 6, 15 11/16; June 13, 15 3/4, June 20, 15 7/8; June 27, 16.

Tire Production Statistics

	Inventory	Production	Total Shipments
Pneumatic Casings—All Types			
1933	8,888,070	45,304,230	44,093,714
1934	9,454,985	47,232,748	46,686,545
1935	8,195,863	49,361,781	50,183,129
1936			
Jan.	8,918,177	4,578,710	3,874,764
Feb.	9,264,595	3,577,221	3,211,040
Mar.	9,087,020	3,637,969	3,855,970
Apr.	9,034,017	4,854,133	4,902,721
Inner Tubes—All Types			
1933	7,814,926	42,555,861	41,390,591
1934	9,179,893	46,227,807	45,045,495
1935	8,231,351	47,879,034	48,066,904
1936			
Jan.	8,622,522	4,591,791	4,167,711
Feb.	8,699,228	3,556,098	3,445,767
Mar.	8,691,651	3,787,226	3,795,505
Apr.	8,788,043	4,824,199	4,746,265
Solid and Cushion Tires			
1933	26,271	130,987	126,990
1934	34,710	197,497	187,152
1935	46,406	283,606	275,741
1936			
Jan.	40,193	25,443	22,670
Feb.	.....	14,730	17,172
Mar.	.....	16,004	21,350
Apr.	.....	32,807	32,611

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1933...	148,989,293	512,489,423	15,880,746,000
1934...	196,069,495	697,558,218	17,063,298,000
1935...	202,318,119	756,773,779	18,167,352,000
1936			
Jan....	15,987,906	61,457,999	1,367,226,000
Feb....	12,059,051	45,839,772	1,150,842,000
Mar...	13,416,664	47,872,526	1,506,582,000
Apr....	16,570,836	64,211,819	1,630,650,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935, 81% for 1936, and 80% for previous years, with the exception of gasoline consumption.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	May, 1936						June, 1936																	
	25	26	27	28	29	30*	1	2	3	4	5	6	8	9	10	11	12	13	15	16	17	18	19	20
No. 1 Ribbed Smoked Sheet	15 3/4	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 3/4	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 7/8
No. 2 Ribbed Smoked Sheet	15 11/16	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 11/16	15 5/8	15 5/8	15 5/8	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 11/16	15 3/4	15 11/16	15 3/4	15 3/4	15 3/4	15 11/16
No. 3 Ribbed Smoked Sheet	15 5/8	15 1/2	15 1/2	15 1/2	15 1/2	..	15 1/2	15 1/2	15 5/8	15 5/8	15 5/8	15 5/8	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 5/8	15 11/16	15 11/16	15 5/8	15 11/16	15 11/16	15 3/4
No. 4 Ribbed Smoked Sheet	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 5/8	15 1/2	15 1/2	15 1/2	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 11/16
No. 1 Thin Latex Crepe...	16 1/16	15 13/16	15 13/16	15 13/16	15 13/16	..	15 13/16	16	16 1/16	16	16	16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/16	16 1/4
No. 1 Thick Latex Crepe..	15 13/16	15 13/16	15 13/16	15 13/16	15 13/16	..	15 13/16	15 7/8	16	15 7/8	15 7/8	15 7/8	16	16	16	16	16 1/16	16	16 1/16	16 1/16	16	16 1/16	16 1/16	16 1/8
No. 1 Brown Crepe.....	15 3/4	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 3/4	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 7/8
No. 2 Brown Crepe.....	15 11/16	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 11/16	15 5/8	15 5/8	15 5/8	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 11/16	15 3/4	15 3/4	15 11/16	15 3/4	15 3/4	15 11/16
No. 2 Amber.....	15 3/4	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 3/4	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 7/8
No. 3 Amber.....	15 11/16	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 11/16	15 5/8	15 5/8	15 5/8	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 11/16	15 11/16	15 3/4	15 11/16	15 11/16	15 11/16
No. 4 Amber.....	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 5/8	15 5/8	15 1/2	15 1/2	15 1/2	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 11/16
Rolled Brown	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	..	15 5/8	15 3/4	15 3/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 5/8	15 3/8	15 5/8	15 3/8	15 3/8	15 5/8	15 3/8	15 5/8

*Holiday.

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers for May, 1936, is estimated at 50,482 long tons, against 51,897 long tons for April, approximately 2.7% under April, although 22.8% above the May, 1935, revised figure of 41,101 long tons, according to the R.M.A.

Crude rubber imports for May totaled 35,600 long tons, 11.8% under the April figure of 40,365 long tons, although 32.5% above the 26,866 long tons imported in May, 1935.

The estimated total domestic stocks of crude rubber on hand May 31 were 248,317 long tons, compared with April 30 stocks of 264,228 long tons and 322,558 (revised) long tons on hand May 31, 1935.

Crude rubber afloat to United States ports on May 31 is estimated at 48,860 long tons against 47,678 long tons afloat on April 30 and 44,375 long tons afloat on May 31, 1935.

London and Liverpool Stocks

Week Ended	London (Tons)	Liverpool (Tons)
May 30	61,356	69,204
June 6	60,000	68,960
June 13	58,886	68,480
June 20	57,048	67,213

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1933	411,615	401,079	365,000	55,606	86,505	44,884	853,100	798,900	616,370
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,018,000	959,400	678,994
1935									
January	42,059	46,636	349,446	42,066	148,337	59,609	77,842	89,216	671,954
February	35,383	42,720	340,264	42,969	155,727	57,586	75,316	90,494	657,717
March	44,041	42,153	340,284	44,485	162,012	55,100	66,478	88,112	652,659
April	43,545	44,247	337,586	37,651	165,064	48,827	75,439	80,261	652,471
May	26,866	41,101	322,558	44,375	167,745	54,740	78,223	71,543	649,991
June	38,340	36,156	324,218	55,581	171,303	51,770	74,675	66,043	648,579
July	46,880	35,917	334,692	49,018	174,227	49,958	71,296	79,719	655,154
August	38,655	38,775	334,106	47,724	177,250	46,482	76,262	80,620	659,851
September	34,569	37,086	331,121	43,413	174,894¶	33,872	74,268	71,290	640,675
October	34,356	41,969	322,857	49,913	168,570	37,597	74,351	70,695	627,363
November	28,826	42,310	308,993	46,588	166,896	32,597	64,677	63,463	595,717
December	34,596	42,474	303.000	39,094	164,295	28,304	63,781	79,420	575,720
1936									
January	31,292	48,506	285,054	43,870	162,107	31,195	62,713	66,182	558,170
February	35,219	36,746	282,902	46,532	157,028	38,421	63,949	59,521	559,932
March	37,451	42,703	276,823	58,935	147,712	29,322	69,296	61,555	539,417
April	40,365	51,897	264,228	47,678	140,404	32,200	59,630	.....	524,655
May	35,600	50,482	248,317	48,860	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat. ¶Including an adjustment of 2,650 tons for loss by fire at Colonial Wharf

RUBBER SCRAP

THE demand for all grades of rubber scrap is fairly active. Tires are holding fairly steady in price; while No. 1 floating tubes are in strong demand at increasing prices due to growing scarcity. Other grades of tubes, truck tires, and mechanical scraps are moving at decreased prices.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

June 27, 1936

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 /$0.01¼
Colored	lb.	.00¾/ .01¼
Untrimmed arctics	lb.	.00¾/ .01¼
Inner Tubes		
No. 1, floating	lb.	.11 / .11½
No. 2, compound	lb.	.04½/ .04¾
Red	lb.	.04 / .04½
Mixed tubes	lb.	.04 / .04⅛
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	8.75 / 9.00
Beadless	ton	12.50 /12.75
Auto tire carcass	ton	14.00 /16.00
Black auto peelings	ton	15.00 /16.00
Solid		
Clean mixed truck	ton	33.00 /34.00
Light gravity	ton	37.00 /38.00
Mechanicals		
Mixed black scrap	ton	14.50 /15.00
Hose, air brake	ton	18.00 /20.00
Garden, rubber covered	ton	14.00 /15.00
Steam and water, soft	ton	14.00 /15.00
No. 1 red	lb.	.02⅞/ .03
No. 2 red	lb.	.02 / .02¼
White druggists' sundries	lb.	.03¼/ .04
Mechanical	lb.	.03½/ .03¾
Hard Rubber		
No. 1 hard rubber	lb.	.12 / .12½

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % to Crude	U. S. Stocks*	Exports
1934	110,010	100,597	22.3	23,079	4,737
1935	122,140	113,530	22.9	25,069	5,383
1936					
January	11,665	10,039	20.7	26,145	572
February	10,188	7,366	20.0	28,267	455
March	10,712	8,767	20.5	29,161	591
April	11,382	10,333	19.9	22,274	589
May	11,512	8,317	16.5	15,889	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

RECLAIM production is well sustained by the active consuming demand stimulated chiefly by the seasonal output of rubber accessories for the automotive industry, also by the pick-up in mechanical goods, and the building industry which is a large user of insulated wire, etc.

Statistics on production, consumption, and stocks of reclaim for May all register a slight advance.

Prices on all grades of reclaim are still favorable for manufacturers desirous to cover their requirements for the balance of the year at present levels. Current quotations on basic grades are unchanged from one month ago.

New York Quotations

June 27, 1936

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	5 / 5¼
Acid	1.18-1.22	6 / 6¼
Shoe		
Standard	1.56-1.60	6⅛/ 6¾
Tube		
No. 1 Floating	1.00	14 /14¾
Compounded	1.10-1.12	7¼/ 7½
Red Tube	1.15-1.30	7¼/ 7¾
Miscellaneous		
Mechanical Blends	1.25-1.50	3½/ 4⅛
White	1.35-1.50	9¼/10¼

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

U. S. Crude and Waste Rubber Imports for 1936

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manitoba and Matto Grosso	Totals 1936	Totals 1935	Balata	Miscellaneous	Waste
Jan. ..... tons	29,130	1,263	597	167	65	70	..	31,292	42,059	20	870	122
Feb.	33,203	1,146	550	217	28	75	..	35,219	35,383	95	665	184
Mar.	35,675	1,296	390	35	15	40	..	37,451	44,041	60	620	142
Apr.	38,286	1,324	559	75	21	100	..	40,365	43,545	167	1,013	456
May	34,048	1,033	342	79	10	88	..	35,600	26,766	146	391	224
Total, 5 mos., 1936 ..... tons	170,342	6,062	2,438	573	139	373	..	179,927	.....	488	3,559	1,128
Total, 5 mos., 1935 ..... tons	184,396	4,149	2,747	334	118	50	..	.....	191,794	269	2,524	99

Compiled from The Rubber Manufacturers Association, Inc., statistics.

COTTON AND FABRICS

New York Quotations

June 27, 1936

Drills		
38-inch 2.00-yard	yd.	$0.13¼
40-inch 3.47-yard		.07⅞
50-inch 1.52-yard		.18
52-inch 1.85-yard		.15
52-inch 1.90-yard		.13⅞
52-inch 2.20-yard		.13
52-inch 2.50-yard		.11¾
59-inch 1.85-yard		.14½
Ducks		
38-inch 2.00-yard D. F.	yd.	$0.13¼/.13½
40-inch 1.45-yard S. F.		.19¼
51½-inch 1.35-yard D. F.		.19¼
72-inch 1.05-yard D. F.		.27⅛/.28¼
72-inch 17.21-ounce		.31½
MECHANICALS		
Hose and belting	lb.	.26
TENNIS		
52-inch 1.35-yard	yd.	.20⅝
***Hollands**		
GOLD SEAL		
20-inch No. 72	yd.	.09
30-inch No. 72		.17¼
40-inch No. 72		.18
RED SEAL		
20-inch	yd.	.08¼
30-inch		.15¾
40-inch		.16½
50-inch		.21
Osnaburgs		
40-inch 2.34-yard	yd.	.10⅝/.11½
40-inch 2.48-yard		10⅛/.11
40-inch 2.56-yard		.09¾
40-inch 3.00-yard		.09⅜
40-inch 7-ounce part waste		.09⅝
40-inch 10-ounce part waste		.13¾
37-inch 2.42-yard		.11⅜
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	yd.	.08
Plaids 60 x 48		.11
Surface prints 60 x 64		.11¾
Print cloth, 38½-inch, 60 x 64		.05½
SHEETINGS, 40-INCH		
48 x 48, 2.50-yard	yd.	.05
64 x 68, 3.15-yard		.08⅞
56 x 60, 3.60-yard		.07¾
44 x 40, 4.25-yard		.06⅛
SHEETINGS, 36-INCH		
48 x 48, 5.00-yard	yd.	.05⅛
44 x 40, 6.15-yard		.04⅝
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.31½
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	lb.	.29½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.30½
CORD FABRICS		
23/5/3 Karded peeler, 1/16" cotton	lb.	.30½
15/3/3 Karded peeler, 1/16" cotton	lb.	.28½
23/5/3 Karded peeler, 1¼" cotton	lb.	.34½
23/5/3 Combed Egyptian	lb.	.46½
LENO BREAKER		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.30½

*For less than 1,000 yards of a width add 10% to given prices.

THE accompanying table gives the general trend of the prices of representative cotton futures for approximately the last two months. Spot middlings from May 25 to June 27 moved slowly upward in New York, reaching 12.49¢ on June 27, the season's high.

The New York Cotton Exchange has issued the following summary of the statistical position of cotton showing world carry-over reduced.

(In 1,000 running bales)

Season	(*)	(†)	(‡)	(§)
1929-30	4,517	14,716	13,046	6,100
1930-31	6,187	13,873	11,084	8,970
1931-32	8,976	16,877	12,590	13,260
1932-33	13,263	12,961	14,415	11,800
1933-34	11,809	12,712	13,820	10,700
1934-35	10,701	9,576	11,236	9,041
1935-36	9,041	10,570	12,500 to 12,600	7,011 to 7,111

(*) Carry-over beginning of season (Aug. 1).
(†) Production in season (including city crop).
(‡) Consumption in season (including destroyed).
(§) Carry-over end of season (July 31).

The current season carry-over of about 7,000,000 bales is large compared with the average end-of-the-season stock in predepression years of about 5,000,000 bales, but it is very greatly less than the peak of 13,263,000 bales in the summer of 1932.

The Exchange figures on consumption follow: "Last season, 1934-35, domestic mills used 5,241,000 bales of the American staple, foreign mills 9,965,000 bales, and world mills 11,206,000 bales. Hence, the increase in domestic consumption from last season to this season will be roughly 750,000 to 850,000 bales, or around 15%; in foreign consumption roughly 550,000 bales, or 9%, and in world consumption 1,300,000 to 1,400,000 bales or around 12%."

Cotton Fabrics

In the present market outlook on cotton fabrics reasonable activity attached to coarse yarn constructions during the first half of June, and good trading continues. A good deal of the buying arises from actual need of supplies, stimulated also by the steady advance of cotton. Increased volume of buying is expected after the political conventions are over.

Fabric prices continue at levels substantially below parity with present raw material cost. Broadly speaking, fabrics are selling at a range close to 10¢ cotton.

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	May 2	May 30	June 6	June 13	June 20
May	11.51	.....	.....	.....	.....
June	11.28	11.57	11.63	11.70	12.22
July	11.05	11.57	11.63	11.70	12.22
Sept.	10.54	11.04	11.28	11.53	11.98
Dec.	10.21	10.47	10.78	11.07	11.50
Mar.	10.30	10.50	10.76	11.10	11.52
May	.....	10.45	10.80	11.13	11.57

United States Latex Imports

Year	Pounds	Value
1931	**10,414,712**	**$884,355**
1932	**11,388,156**	**601,999**
1933	**24,829,861**	**1,833,671**
1934	**29,276,134**	**3,633,253**
1935	**30,358,748**	**3,782,222**
1936		
Jan.	**3,733,665**	**474,682**
Feb.	**3,268,542**	**406,985**
Mar.	3,196,083	417,704
Apr.	3,610,511	522,049

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for May, 1936:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

	May, 1936	
To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	3,457	160
United States	27,732	841
Continent of Europe	7,172	345
British possessions	3,348	64
Japan	3,246	21
Other countries	178	10
Totals	45,127	1,441

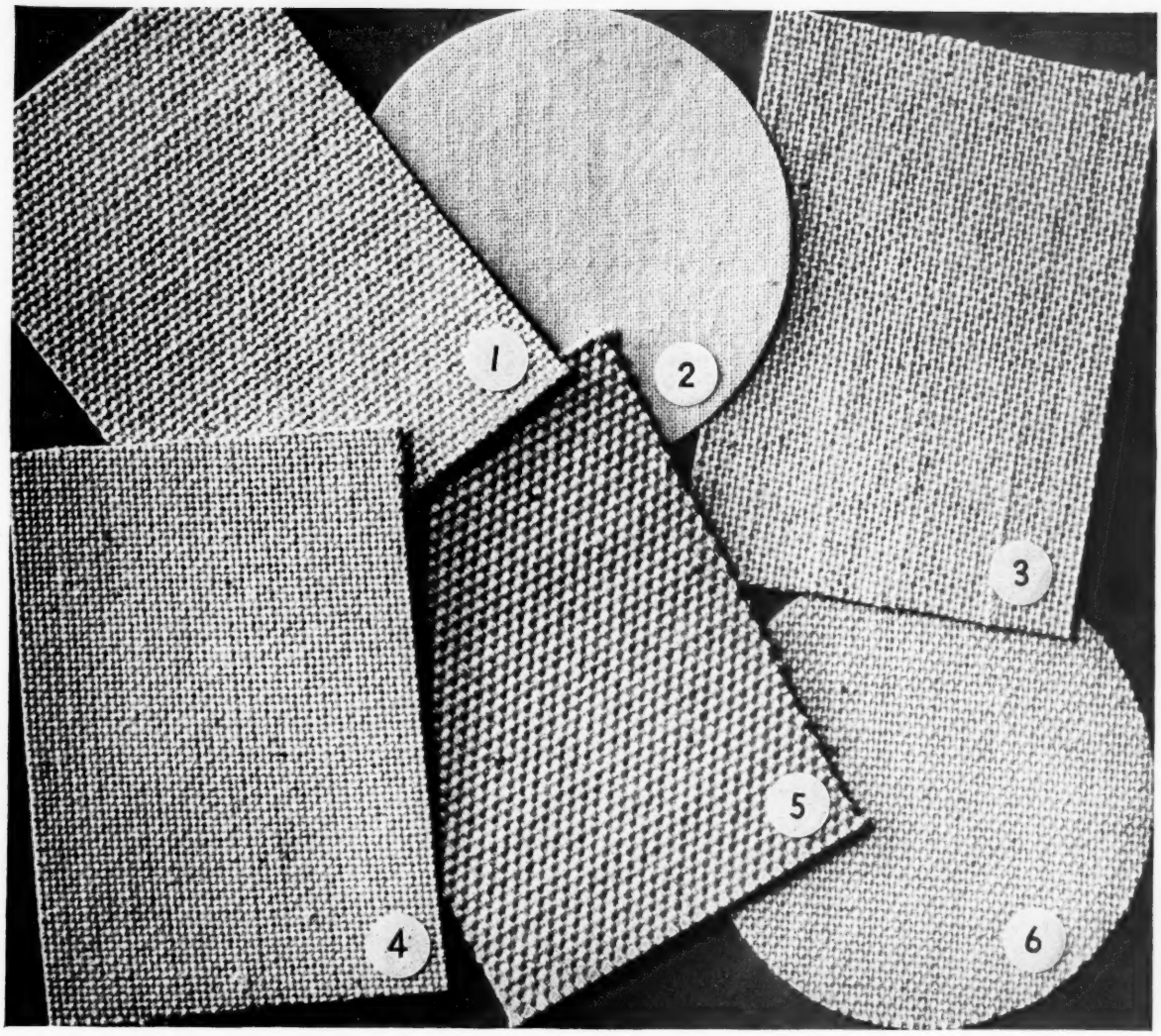
Rubber Imports: Actual, by Land and Sea

	May, 1936	
From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	2,559	2,382
Dutch Borneo	1,842	76
Java and other Dutch islands	181	...
Sarawak	2,134	252
British Borneo	215	10
Burma	290	28
Siam	1,577	716
French Indo-China	61	125
Other countries	71	8
Totals	8,930	3,597

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Czecho-slovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1933	**398,400**	**73,300**	**13,500**	**11,200**	**19,300**	**10,400**	**63,100**	**54,100**	**19,300**	**66,900**	**30,800**	**38,600**	**798,900**
1934	**438,900**	**158,500**	**9,600**	**9,100**	**28,400**	**11,000**	**50,400**	**59,300**	**21,400**	**69,900**	**47,300**	**55,600**	**959,400**
1935	**455,355**	**128,829**	**9,977**	**7,593**	**26,868**	**11,225**	**52,322**	**62,901**	**23,916**	**57,589**	**37,576**	**56,725**	**930,876**
1936													
Jan.	33,260	4,573	1,260	**760**	**1,758**	**767**	**6,770**	**5,545**	1,500*	4,357	467	5,165	66,182
Feb.	33,789	1,271	735	779	1,900	344	6,288	5,257	1,000*	2,787	94	5,277	59,521
Mar.	33,743	1,227	819	1,033	1,809	410	4,342	4,568	1,000*	5,172	4,376	5,510	61,555

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*



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Seventeen mills and adequate engineering and laboratory facilities assure you of technical excellence and ultimate economy.

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2. *COLUMBUS Sheeting*
3. *WEST POINT Osnaburg*
4. *WEST POINT Chafer Fabric*
5. *SHAWMUT Belting Duck*
6. *SHAWMUT Hose Duck*

Our 538-page Handbook of Industrial Fabrics gives a very complete description of cotton, cotton manufacturing processes, uses for industrial fabrics, laboratory test methods, specifications, etc. Price $2.00. One copy free to any well-rated rubber manufacturer in the United States, upon request on company letterhead.

WELLINGTON SEARS COMPANY

65 WORTH STREET NEW YORK

Editor's Book Table

NEW PUBLICATIONS

"Robertson Reminders." June, 1936, Vol. 4, No. 2. John Robertson Co., Inc., 121-135 Water St., Brooklyn, N. Y. This issue features the new Model G lead sheath stripper, tin pipe marking device, and other extrusion press appliances.

"Gastex Folder." General Atlas Carbon Co., 60 Wall St., New York, N. Y. Notes are given from the account published in *Electrical Review*, London, September 23, 1893, and in INDIA RUBBER WORLD, October 15, 1893, on the revival of the use of Hooper's rubber insulation core for submarine cables.

"O. N. V. Rubber Accelerator." Naugatuck Chemical Division of United States Rubber Products, Inc., 1790 Broadway, New York, N. Y. This bulletin, arranged for filing, introduces O. N. V., a new accelerator for mold, steam, or air vulcanization and includes 11 charts and graphs showing effect of as many compounding ingredients, alkali reclaim, and variation of temperature on rate of cure.

"Micromax Electric Control for Proportioning Input to Demand." Catalog N-00-A. Leeds & Northrup Co., 4902 Stenton Ave., Philadelphia, Pa. This eight-page illustrated catalog describes the three integral parts of this new complete system for regulating input in proportion to demand: namely, Micromax control instrument, relay detector, and valve mechanism.

"Changes in Import Duties Since the Passage of the Tariff Act of 1930." Second Edition. United States Tariff Commission, Washington, D. C. The lists in this pamphlet include changes in duties made under the provisions of Section 336 of the Tariff Act of 1930 and under the Trade Agreements Act, taxes on imports provided for in the Revenue Acts of 1932, 1934, and 1935 as modified, and effective changes in the tariff respecting Philippine merchandise. All changes in United States duties brought about by the 14 reciprocal trade agreements thus far concluded under the Trade Agreements Act are included in this edition. The list of changes by presidential proclamation shows the paragraph number in the Tariff Act of 1930, a description of the articles, the rate changed, the effective proclaimed duty, the effective date of the change, and the basis for the change. The Tariff Commission has a limited number of copies of the pamphlet for distribution, and it is on sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., for 10¢ a copy.

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The May-June, 1936, issue records the effect of aging in the air bomb at 260° F. and at 300° F. on a large number of typical normal sulphur, low sulphur, and Tuads cured stocks. Also a half-dozen formulae are given for commercial heat resistant stocks using Vanderbilt compounding materials with good effect. The test data are, as usual, both tabulated and appropriately shown in graphs.

Givaudanian. May, 1936. Industrial Aromatics Division, Givaudan-Delawanna, Inc., 80 Fifth Ave., New York, N. Y. In addition to timely articles this issue contains an obituary of Leon Givaudan, president and co-founder with his brother Xavier Givaudan of the present international organization about 40 years ago.

"Bristol's Model 90 Controller—Pneumatic Type." Bulletin 444. The Bristol Co., Waterbury, Conn. This eight-page illustrated bulletin contains description and data of a new controller for temperature, liquid level, and pressure.

"Crown Clay." Southeastern Clay Co., 70 Pine St., New York, N. Y. This four-page illustrated folder contains a short story on Crown clay, its origin, and application to rubber industry.

"Waldron Gear Type Flexible Couplings." John Waldron Corp., New Brunswick, N. J. Catalog No. 52. Included are descriptions, data, and illustrations of the two distinct designs of Waldron gear couplings: namely, the Medium Duty and the Torque Ring.

"Link Belt Anti-Friction Bearing Units." Book No. 1520. Link Belt Co., 307 N. Michigan Ave., Chicago, Ill. This forty-page illustrated book of data will be appreciated by mill engineers when seeking information on a full line of anti-friction bearings for all conditions of service.

"What Is Happening in Akron." The Goodyear Tire & Rubber Co., Akron, O. This 12-page statement of facts regarding the labor trouble at the Akron plants of the Goodyear company is issued "For Information" and dated May 29, 1936. It presents a brief factual resumé of 15 sit-downs that occurred between March 21, 1936, when the strike was settled, and May 25, 1936; editorials from the *Akron Beacon Journal* of May 21 and May 23, and *Akron Times Press* of May 26.

(*Continued on page 80*)

BOOK REVIEWS

"Pneumatic Equipment for Farm Tractors." Alexander Hay, Agricultural Liaison Officer, The Rubber Growers' Association. Rubber and Agricultural Series, Bulletin No. 1. The Rubber Growers' Association, Inc., 19 Fenchurch St., London, E.C.3, England. Paper, 18 pages, 5½ by 8½ inches. Illustrated.

This publication is the first of a series on new developments of rubber of interest to industry generally. The topics treated in the present number are the development of tractor pneumatic tires, their construction, advantages, fuel consumption, life, non-skid devices, tires for special purposes, and tractor drawn equipment. A brief appendix gives the experience with rubber tired farm tractors in the U.S.A. in the form of a summarized statement from the report issued by the Agricultural Engineering Department, University of Nebraska, 1935.

In subsequent bulletins it is hoped to deal with further special aspects of the use of rubber in the agricultural industry. Any reader interested may obtain a copy free of charge from F. G. Smith, secretary of the Rubber Growers' Association.

"An Outline of Malayan Agriculture." Compiled by D. H. Grist, agricultural economist, Department of Agriculture, Straits Settlements and Federated Malay States, Kuala Lumpur, 1936. Cloth, 388 pages, 5¾ by 6 inches. Indexed. Two maps and 86 plates. Price $3.

This book retains a few of the features of its predecessors, but has been entirely rewritten to present a picture of Malayan agriculture in 1935. The work classes rubber as first of the five major crops and will be of considerable value as a concise compendium for the planter, agriculturist, student, administrator, and those in search of general information.

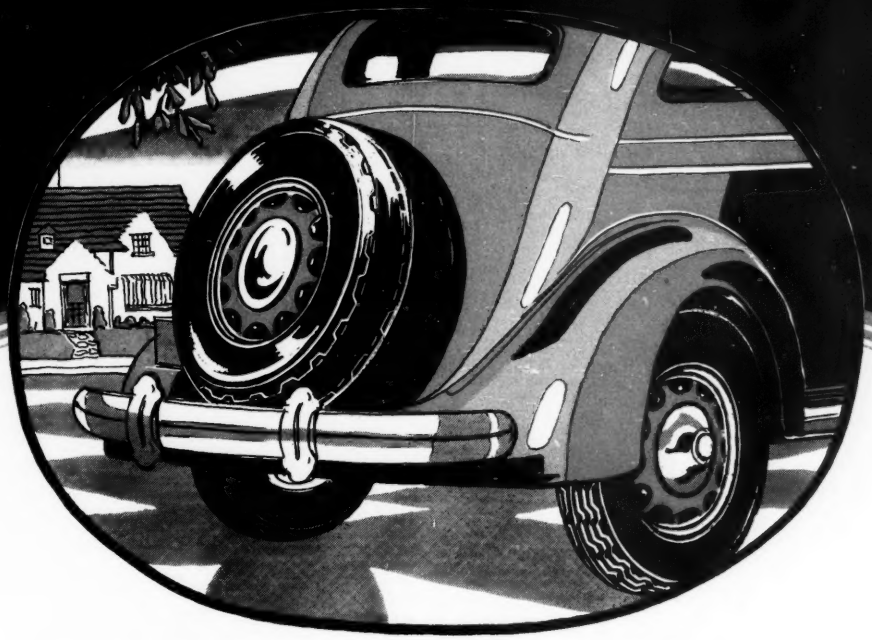
"Advertising and Selling Industrial Goods." Virgil D. Reed. The Ronald Press Co., New York, N. Y. Cloth, 287 pages, 5¾ by 8¼ inches. Indexed. Illustrated. Price $3.50.

Readers of this practical manual will be rewarded by acquiring expert counsel on developing successful industrial advertising and sales promotion plans from a seasoned advertising executive with unusual experience in building up from modest initial appropriations. He gives valuable suggestions on strategy, tactics, and technique to help you expand business and make advertising dollars go farther.

(*Continued on page 80*)

"BLACK MAGIC" PACES
THE MOTOR WORLD

Consider Sun Checking



MICRONEX

THE MASTER COLLOID

Beads or Compressed

BINNEY & SMITH CO. • 41 EAST 42ND ST., NEW YORK • COLUMBIAN CARBON CO.

Plus-values of Micronex

At this season of the year every amateur photographer knows that the intensity of daylight is at least double that of a similar day in winter. The intensity of the ultra violet rays shows a far greater seasonal variation and just now is at its maximum height.

It is these rays which exercise so devastating an effect on rubber compounds. Just how the damage is caused is not entirely understood, but it is generally considered to be from ozone which these short waves assist in producing.

While, to a certain degree, it is possible to mitigate this damage by adding various waxes, the material which most effectively stops these rays and prevents them from penetrating below the surface of the rubber is a dense substance which is itself smaller than the rays and so closely integrated that these hostile emanations cannot enter.

In previous discussions in this space it has been suggested that Micronex fills in the voids between the molecules of rubber. By so doing, it forms a blanket that protects the under surfaces and so prevents cracks from extending to the carcass underneath.

Carbon black of the highest grade is the only compounding ingredient which is composed of opaque particles sufficiently small to absorb and block the path of these penetrating rays.

Micronex has an average particle diameter of about 1/16 micron. The wave length of visible light is from six to twelve times as great, and the wave length of such ultra violet sun rays as reach the surface of the earth is over four times that of a Micronex particle.

•

BINNEY & SMITH CO.

Research and Development Department

A Binney & Smith MASTER COLLOID

MICRONEX MEANS MORE MILEAGE

COMPOUNDING INGREDIENTS

CARBON BLACK. During the first half of 1936 carbon black consumption by the rubber industry greatly exceeded that in the same period a year ago. No change in price has been made on contracts for the second half of this year.

FACTICE. The proposal by Congress to put a 4½¢ tax on most of the important vegetable oils has been very disturbing to manufacturers. The Senate eliminated very recently the tax on denatured rapeseed oil. If the proposed tax becomes effective, a seasonable business is expected.

LITHARGE. The mildly active demand of May improved in June. Prices continue unchanged.

LITHOPONE. Demand showed distinct improvement in June. Prices for the second half-year remain the same as for the first half.

RUBBER CHEMICALS. Business is good, with indications of a slight falling off in consumer demand. Two new items are now available for the use of compounders: namely, T.1.,[1] a special thickener for latex, which represses frothing and stabilizes compounds; and O. N. V.,[2] a high-speed all-purpose accelerator for dry rubber stocks.

RUBBER COLORS. Prices of most of the standard mineral colors are about at or even below cost level. It would seem that the makers would soon cease warring upon each other and price their products to show at least a nominal profit.

TITANIUM PIGMENTS. As the peak of the white footwear season has passed, naturally a falling off in the demand for opacifying and brightening pigment has resulted. Here and there, however, the general distribution to the rubber trade is being well maintained. Volume of sales, particularly on titanium dioxide, is better than during last year. Prices are at the same level as for the past two years, and contracts for the last six months are being written or renewed on these schedules to replace commitments that expired June 30.

ZINC OXIDE. Producers of zinc oxide are changing their coverage from six months to 90 days. In other words, consumers will be covered for the third quarter only. In going on a 90-day contract basis zinc oxide producers are lining up with the lead pigment and chemical industries. The prices of most of the products in these lines are guaranteed for the third quarter only. This condition is an indication that the prices are low and that adjustments should and probably will be made in the near future.

[1] See p. 80.
[2] See p. 49.

New York Quotations

June 27, 1936

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	$0.02½/$0.03½
Rottenstone, domestic	lb.	.03 / .03½
Silica, 15	ton	38.00
Accelerators, Inorganic		
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.07
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½/ .07
Accelerators, Organic		
A-1	lb.	.21 / .25
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	
Accelerator 49	lb.	.42
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.47
D.O.T.T.U.	lb.	
DPG	lb.	.37
El-Sixty	lb.	
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.11
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
O. N. V.	lb.	
Ovac	lb.	
Pipsolene	lb.	
R-2	lb.	1.50 / 1.90
Base	lb.	4.55 / 5.00
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No 1	lb.	
No. 2	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	$0.62 /$1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	.48 / .60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	
ZML	lb.	
Activator		
Barak	lb.	
Age Resisters		
Age-Rite Gel	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
D	lb.	
Syrup	lb.	
White	lb.	
Akroflex C	lb.	
Albasan	lb.	
Antox	lb.	
B-L-E	lb.	
B-X-A	lb.	
Copper Inhibitor X-872	lb.	
Flectol B	lb.	
H	lb.	
White	lb.	
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	
Parazone	lb.	
Perflectol	lb.	
Permalux	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	
Alkalies		
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	3.00 / 4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.60
Antiscorch Materials		
Antiscorch T	lb.	
Cumar RH	lb.	.09
Retarder B	lb.	
W	lb.	
T-J-B	lb.	
U.T.B.	lb.	
Antisun Materials		
Heliozone	lb.	
Sunproof	lb.	
Brake Lining Saturant		
B. R. T. No. 3	lb.	$0.016 /$0.018
Colors		
BLACK		
Lampblack (commercial)	lb.	.15
BLUE		
Brilliant	lb.	
Prussian	lb.	.37½
Toners	lb.	.80 / 3.50
BROWN		
Mapico	lb.	.13
GREEN		
Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	
oxide	lb.	.18½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50
ORANGE		
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb.	1.50 / 4.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.00
RED		
Antimony		
Crimson, 15/17%	lb.	.50
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48 / .52
Golden 15/17%	lb.	.28
7-A	lb.	.35
Z-2	lb.	.22
Aristi	lb.	1.75
Cadmium, light (400 lb. bbls.)	lb.	.70
Chinese	lb.	
Crimson	lb.	
Mapico	lb.	
Medium	lb.	
Rub-Er-Red	lb.	.09¼
Scarlet	lb.	
Toners	lb.	.80 / 2.00
WHITE		
Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label-11	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
ZS No. 20	lb.	.10½/ .10¾
No. 86	lb.	.10½/ .10¾
Sunolith (5-ton lots)	lb.	.04½
Ray-Bar	lb.	

Ray-Cal ..... lb.
Rayox ..... lb.
Titanolith (5-ton lots) ..... lb. $0.06
Titanox-A (50-lb. bags) ..... lb. .17 /$0.18½
B (50-lb. bags) ..... lb. .06 / .06¼
C (50-lb. bags) ..... lb. .06 / .06¼
Ti-Tone ..... lb.
Zinc Oxide
Anaconda, Green Seal
No. 333 ..... lb. .06 / .06¼
Lead Free No. 352 ..... lb. .05 / .05¼
No. 570 ..... lb. .05 / .05¼
No. 577 ..... lb. .05 / .05¼
Red Seal No. 222 ..... lb. .05½/ .05¾
U.S.P. No. 777 (bbls.) lb. .08
White Seal No. 555 ..... lb. .06½/ .06¾
Azo ZZZ-11 ..... lb. .05 / .05¼
44 ..... lb. .05 / .05¼
55 ..... lb. .05 / .05¼
66 ..... lb. .05 / .05¼
French Process, Florence
White Seal-7 (bbls.) lb. .06½/ .06¾
Green Seal-8 ..... lb. .06 / .06¾
Red Seal-9 ..... lb. .05½/ .05¾
Kadox, Black Label-15 .. lb. .05 / .05¼
Blue Label-16 ..... lb. .05 / .05¼
Red Label-17 ..... lb. .05 / .05¼
Horse Head Special 3 .... lb. .05 / .05¼
XX Red-4 ..... lb. .05 / .05¼
23 ..... lb. .05 / .05¼
72 ..... lb. .05 / .05¼
78 ..... lb. .05 / .05¼
80 ..... lb. .05 / .05¼
103 ..... lb. .05 / .05¼
110 ..... lb. .05 / .05¼
St. Joe (lead free)
Black Label No. 20 .... lb. .05 / .05¼
Green Label No. 42 .... lb. .05 / .05¼
Red Label No. 30 ..... lb. .05 / .05¼
U.S.P. X ..... lb. .08
White Jack ..... lb. .10½/ .11½

YELLOW

Cadmolith (Cadmium yellow), 400-lb. bbls. ..... lb. .45
Lemon ..... lb.
Mapico ..... lb. .09½
Toners ..... lb. 2.50

Dispersing Agents

Bardol ..... lb. .021 / .023
Darvan ..... lb.

Factice

Amberex ..... lb. .26
Brown ..... lb.
Duphax A ..... lb.
B ..... lb.
Fac-Cel B ..... lb.
C ..... lb.
White ..... lb.

Fillers, Inert

Asbestine, c.l., f.o.b. mills. ton 15.00
Barytes ..... ton 30.00
f.o.b. St. Louis (50 lb. paper bags) ..... ton 22.85
off color, domestic ..... ton 20.00 /25.00
white, imported ..... ton 29.00 /32.00
Blanc fixe, dry, precip ..... lb. .03½/ .05
Calcene ..... ton 37.50 /45.00
Infusorial earth ..... lb. .02 / .03
Kalite No. 1 ..... ton
No. 3 ..... ton
Whiting
Columbia Filler ..... ton 9.00 /14.00
Domestic ..... 100 lbs.
Guilders ..... 100 lbs.
Hakuenka ..... lb.
Paris white, English cliff-stone ..... 100 lbs.
Southwark Brand, Commercial ..... 100 lbs.
All other grades .. 100 lbs.
Suprex, white extra light. ton 45.40 /60.00
heavy ..... ton 45.40 /60.00
Witco, c.l. ..... ton 7.00

Fillers for Pliability

P-33 ..... lb.
Thermax ..... lb.
Velvetex ..... lb. .03 / .04½

Finishes

IVCO lacquer, clear ..... gal.
colors ..... gal.
Rubber lacquer, clear ..... gal.
colored ..... gal.
Starch, corn, pwd. ..... 100 lbs.
potato ..... lb.
Talc ..... ton 25.00 /45.00
Dusting ..... ton
Pyrax ..... ton

Flock

Cotton flock, dark ..... lb. .11¼/ .14
dyed ..... lb. .50
white ..... lb. .14½/ .20
Rayon flock, colored ..... lb. 1.25 / 1.60
white ..... lb. 1.10

Latex Compounding Ingredients

Accelerator 85 ..... lb.
89 ..... lb.
122 ..... lb.
552 ..... lb.
Alphasol-OS ..... lb. .60
Antox, Dispersed ..... lb.
Aquarex A ..... lb.
D ..... lb.
F ..... lb.
Aresklene ..... lb.
Black No. 25, Dispersed .... lb. $0.22 /$0.40
Catalpo ..... ton
Color Pastes, Dispersed .... lb.
Dispersaid ..... lb. 1.50
Dispersex No. 15 ..... lb. .80 / .90
No. 20 ..... lb. .60 / .75
Emo, brown ..... lb.
white ..... lb.
Factice Compound, Dispersed ..... lb.
Heliozone, Dispersed ..... lb.
Igepon A ..... lb.
Micronex, Colloidal (75 lbs.) lb. .11
320 lbs. ..... lb. .08
Nekal BX (dry) ..... lb.
Palmol ..... lb. .085
Paradors ..... lb.
Stablex A ..... lb. 1.75
B ..... lb. .90
C ..... lb. .30
Sulphur, Dispersed ..... lb. .10 / .15
T.1. (400 lb. drums) ..... lb. .40
Tepidone ..... lb.
Vulcan Colors ..... lb.
Zinc oxide, Colloidal ..... lb.
Dispersed ..... lb. .09 / .15

Mineral Rubber

B. R. C. No. 20 ..... lb. .0125/ .014
Black Diamond ..... ton 25.00
Genasco Hydrocarbon, granulated, (fact'y) ... ton
solid ..... ton
Gilsonite Hydrocarbon (factory) ..... ton
Hydrocarbon, hard ..... ton
soft ..... ton
Parmr Grade 1 ..... ton 25.00
Grade 2 ..... ton 31.00
Pioneer ..... ton
265° ..... ton

Mold Lubricants

Mold Paste No. 1 ..... lb.
Rusco mold paste ..... lb. .12 / .30
Sericite ..... ton 65.00 /70.00
Soapbark ..... lb.
Soapstone ..... ton 25.00 /35.00

Oil Resistant

AXF ..... lb.

Reclaiming Oils

B. R. V. ..... lb. .039 / .041
S. R. O. ..... lb. .015 / .019

Reenforcers

Carbon Black
Aerfloted Arrow Specification Black ..... lb. .0535/ .0825
Arrow Compact Granulized Carbon Black ..... lb.
"Certified" Heavy Compressed, Cabot ..... lb.
Spheron ..... lb.
Disperso (delivered) .... lb. .0445/ .0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock delivered... lb. .07 / .08¼
Dixiedensed, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock delivered... lb. .07 / .08¼
Excello, c.l., f.o.b. Gulf ports ..... lb. .0445/ .0645
delivered New York. lb. .0535/ .0735
l.c.l., delivered New York ..... lb. .07 / .08¼
Fumonex, c.l., f.o.b. works. lb. .03
ex-warehouse ..... lb. .04½
Gastex ..... lb. .03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock delivered... lb. .07 / .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ... lb. .0445
c.l., delivered New York. lb. .0535
local stock delivered... lb. .07 / .08¼
Micronex Beads, c.l., f.o.b. Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. .0535
local stock, l.c.l., delivered ..... lb. .07 / .08¼
Mark II, c.l., f.o.b. Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. .0535
local stock, l.c.l., delivered ..... lb. .07 / .08¼
Standard, c.l., f.o.b. Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. .0535
local stock, l.c.l., delivered ..... lb. .07 / .08¼
W-5, c.l., f.o.b., Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. $0.0535
local stock, l.c.l., delivered ..... lb. .07 /$0.08¼
W-6, c.l., f.o.b., Gulf ports ..... lb. .0445
c.l., delivered New York ..... lb. .0535
local stock, l.c.l., delivered ..... lb. .07 / .08¼
Pelletex ..... lb. .03 / .07
Supreme, c.l., f.o.b. Gulf ports ..... lb. .0445/ .0645
delivered New York. lb. .0535/ .0735
l.c.l., delivered New York ..... lb. .07 / .08¼
"WYEX BLACK" ..... lb.
Carbonex ..... lb. .03 / .0375
Carbonex "S" ..... lb. .0315/ .04
Clays
Aerfloted Paragon ..... ton 8.50
Suprex No. 1 Selected. ton 10.00
No. 2 Standard ..... ton 8.50
China ..... ton
Dixie ..... ton
Junior ..... ton
McNamee ..... ton
Par ..... ton
Witco ..... ton 8.50
Cumar EX ..... lb. .04

Reodorants

Amora A ..... lb.
B ..... lb.
C ..... lb.
D ..... lb.
Paradors ..... lb.
Rodo No. 0 ..... lb.
No. 10 ..... lb.

Rubber Substitutes

Black ..... lb. .07 / .11
Brown ..... lb. .08 / .14
White ..... lb. .08½/ .13

Softeners

Burgundy pitch ..... lb. .05
Cycline oil ..... gal. .15 / .28
Palm oil (Witco) ..... lb. .05½
Petrolatum, amber (f.o.b. refinery, Warren, Pa.) ... lb. .02½/ .03¼
light amber ..... lb. .02¾/ .03½
Pine tar ..... gal.
Plastogen ..... lb.
Reogen ..... lb.
Rosin oil, compounded .... gal. .40
RPA No. 1 ..... lb.
Rubtack ..... lb. .10
Tackol ..... lb. .085 / .18
Tonox ..... lb.
Powder ..... lb.
Witco No. 20 ..... gal. .15

Softeners for Hard Rubber Compounding

RSL Resin ..... lb.
Resin C Pitch 55° C. M.P. .. lb. .0125/ .0145
Resin C Pitch 70° C. M.P. .. lb. .0125/ .0145
Resin C Pitch 85° C. M.P. .. lb. .0125/ .0145

Solvents

Beta-Trichlorethane ..... gal.
Bondogen ..... lb.
Carbon bisulphide ..... lb.
tetrachloride ..... lb.

Stabilizers for Cure

Laurex, ton lots ..... lb.
Stearex B ..... lb. .075
Beads ..... lb. .074
Stearic acid, single pressed. lb. .075
Stearite ..... 100 lbs. 7.40
Zinc stearate ..... lb. .22

Synthetic Rubber

"DuPrene"[1] Latex Type 50. lb.
53 ..... lb.
54 ..... lb.
Type E ..... lb.
"Thiokol" A (f.o.b. Yardville) ..... lb. .35
Coating Materials ..... gal. 3.00 / 5.00
D ..... lb. .65
Molding Powder ..... lb. .55 / .70

Tackifier

B. R. H. No. 2 ..... lb. .014 / .02

Varnish

Shoe ..... gal. .145

Vulcanizing Ingredients

Sulphur
Chloride, drums ..... lb. .03½/ .04
Rubber ..... 100 lbs. 1.95
Telloy ..... lb.
Vandex ..... lb.
(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky ... lb. .35
2 N.C. ..... lb. .40
3 N.C. ..... lb. .35
1 Yellow ..... lb. .44½
2 ..... lb. .43½
Montan, crude ..... lb. .11

[1] Trade mark registered.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

ACCOUNTANT-ENGINEER: SEVERAL YEARS' EXPERIENCE IN rubber industry. Appraisal engineer, plant accounting, plant maintenance, sales coordination, production control, and absolute costs. Would be available immediately. Anywhere in East or Canada. Address Box No. 672, care of INDIA RUBBER WORLD.

SITUATION WANTED AS FACTORY SUPERINTENDENT OR press room foreman. Experience on hard and soft rubbers, miscellaneous druggists' sundries and mechanicals. Address Box No. 676, care of INDIA RUBBER WORLD.

MANUFACTURING EXECUTIVE AND FACTORY MANAGER with full knowledge of compounding and production of molded rubber products, brake blocks, brake lining, and clutch facings seeking connection with individual or firm interested in manufacturing above products. Have complete formulae and processes all tried and proved and have full knowledge of design and installation of all equipment necessary for producing above products. Address Box No. 677, care of INDIA RUBBER WORLD.

GENERAL SUPERINTENDENT: MECHANICAL RUBBER GOODS, golf ball tape, rubber thread, soles and heels; knowledge of formulae; design molds, etc. Available immediately. Address Box No. 680, care of INDIA RUBBER WORLD.

WANTED: POSITION AS DEPARTMENT FOREMAN IN SPREADing, etc. Experienced in all kinds of rubberized fabrics, quarter linings, proofings, combinings, etc. Address Box No. 681, care of INDIA RUBBER WORLD.

UNIVERSITY GRADUATE CHEMICAL ENGINEER, exceptional rubber compounding experience, full knowledge of rubber chemicals and manufacturing processes, desires connection with responsible company either as compounder or in sales development. Address Box No. 684, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

SALESMAN CALLING ON RUBBER MANUFACTURers increase earnings sell steam specialty. Sideline. Pays good commission. Repeat orders. Address Box No. 674, care of INDIA RUBBER WORLD.

WANTED: CHEMIST OF GOOD TRAINING FOR RESPONsible position. Thoroughly experienced in the manufacture of all lines of proofed and coated fabrics. Capable of handling development work in this field. Give details of training and experience and salary expected. Address Box No. 675, care of INDIA RUBBER WORLD.

WANTED: EXPERIENCED BRAKE LINING ENgineer to take charge of research laboratory. Address Box No. 678, care of INDIA RUBBER WORLD.

WANTED: RUBBER TILE SALESMEN ACQUAINTED WITH architects, contractors and retail trade. Address Box No. 682, care of INDIA RUBEER WORLD.

SALESMAN FOR MECHANICAL RUBBER GOODS NEW YORK Metropolitan area. Must have practical factory experience in rubber compounding. Reference required. Address Box No. 683, care of INDIA RUBBER WORLD.

ESTABLISHED COMPANY ENLARGING STAFF HAS OPENING for graduate chemical engineer with one or two years' experience in rubber industry. Permanent position laboratory, factory control, development. Give salary desired and detailed experience. Address Box No. 685, care of INDIA RUBBER WORLD.

(Advertisements continued on page 81)

New Publications

(*Continued from page* 74)

"Continuous Vulcanization of Transmission Belting." Boston Woven Hose & Rubber Co., Box 1071, Boston, Mass. This brief account prepared by the technical department of the company is on the only important improvement in manufacturing process during the life of the rubber industry. The facts given are based on data assembled during the development of the new principle of belt manufacture and the performance of the product in actual service.

"List of Inspected Electrical Appliances—May, 1936." Underwriters' Laboratories, 207 E. Ohio St., Chicago, Ill. Paper, 295 pages, 6 by 9 inches. Indexed. This semi-annual revision replaces all similar lists and supplements of earlier dates. The list is combined of appliances inspected for accident hazard, automotive appliances, burglary protection appliances, a list of inspected fire protection, and a list of gas, oil, and miscellaneous appliances.

Book Reviews

(*Continued from page* 74)

"Rubber Latex." Henry P. Stevens, M.A. (Oxon.), Ph.D., F.I.C., and W. H. Stevens, A.R.C.Sc., F.I.C., consulting chemist to the Rubber Growers' Association, etc. Issued by The Rubber Growers' Association, Inc., 19 Fenchurch St., London, E.C.3, England, 1936. Paper, 224 pages, 5½ by 8½ inches. Indexed. Illustrated.

The book deals with the properties, composition, coagulation, concentration, manipulation, and compounding of latex and latex pastes and its stabilization for industrial purposes. The vulcanization of latex and latex products, dipping, and electro-deposition and the marketing and applications of latex are also discussed. A final chapter deals with a selected list of nearly 1,000 recent British patents and testifies to the growing importance attached to the direct application of latex. Indexes to the text and to the patents, together with a very full bibliography of books of reference and literature are included and should prove very useful. Any reader interested in this subject may obtain a copy of "Rubber Latex" on application to the Rubber Growers' Association.

"The Traffic Dictionary. A Compendium of Domestic and Foreign Trade and Shipping Terms, Phrases and Abbreviations." C. S. Nelson and Geo. T. Stufflebeam. Third Edition, Thoroughly Revised. Shipping Service Organization, Publishers, New York, N. Y. Cloth, 224 pages, 4¾ by 6¼ inches. Illustrated. Price $1.25.

Traffic managers and shipping departments will find this book indispensable. It contains two major sections. Section One concisely and clearly covers over 2,500 authentic definitions of domestic and foreign trade and shipping terms, phrases, expressions, and abbreviations. Fully explained, they are arranged alphabetically and are completely cross-indexed. Section Two is an appendix describing and illustrating shipping room equipment and supplies. The value and importance of the appendix lies in its up-to-the-minute information regarding modern shipping methods which lead to better service, decreased transportation costs, and increased profits.

"Workshop Receipts for Manufacturers and Scientific Amateurs." Vol. IV. New and Revised Edition. The Chemical Publishing Co., New York, N. Y. Cloth, 543 pages, 4¼ by 7 inches. Indexed. Illustrated. Price $2.50 per volume.

The volume at hand is one of a set of four volumes of workshop receipts. These practical books have been sold in England to chemists, engineers, scientists, executives, colleges, manufacturers, farmers, mechanics, home experimenters, and home owners, with great satisfaction to all. Although it contains many formulae, it is not a formula book. It details processes, manipulations, and handy methods which are the results of years of experience of practical experts. For the first time are revealed many invaluable trade processes and secrets. Explicit details and many hundreds of illustrations are given. Volume IV covers the alphabet from R to W and includes such items as refrigeration, rubber stamps, type, and rubber stamp ink, sandblast processes, stuffing box packing, tile laying, valve grinding, varnishes, waterproofing, etc.

T.1.

A new product known as T.1., for which a patent is pending, has been introduced for thickening vulcanized latex compounds such as those for dipped and spread goods and general purposes. The material, a clear liquid of light amber color, may be added directly to the latex solution under slow speed agitation to avoid entrapping air in the mixing. It has no effect on vulcanization.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*891	Liquid or paste rubber for making casting molds	Montreal, Canada
†898	Vulcanizing material, such as cement and camel back material.	Johannesburg, South Africa
†923	Belting	Calcutta, India
*932	Tire repairing compounds	Medan, Sumatra
‡941	Power transmission belting	Bombay, India
†957	Sport goods	Cairo, Egypt
*968	Latex machinery and equipment as dipping machines, vulcanizing cabinet, and calenders	Kaunas, Lithuania
†1,004	Sanitary goods and rubber and cork bath mats	Johannesburg, South Africa
†1,025	Chlorinated rubber for making varnish, etc..	Boulogne sur Seine, France
*1,028	Automobile flooring...	Oslo, Norway

*Purchase. †Agency. ‡Purchase and agency.

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania Total	Philippines and Oceania Africa	South America	Mexican Guayule	Grand Total
1933	**445,800**	**282,300**	**63,800**	**1,400**	**3,400**	**7,800**	**11,100**	**7,000**	**17,300**	**839,900**	**1,100***	**2,000**	**10,100**	**0** **853,100**
1934	**467,000**	**379,400**	**79,100**	**6,500**	**6,300**	**11,100**	**17,700**	**17,700**	**19,600**	**1,004,400**	**1,200***	**2,900**	**9,100**	**400** **1,018,000**
1935														
Jan.	41,665	18,726	6,294	782	315	1,238	1,536	2,614	2,575	75,745	105	467	1,525	0 77,842
Feb.	32,824	28,019	5,551	383	487	760	1,880	2,288	2,018	74,210	156	254	696	0 75,316
Mar.	**34,047**	**22,403**	**1,720**	**278**	**373**	**773**	**1,874**	**2,076**	**1,440**	**64,984**	82	525	887	0 66,478
Apr.	37,442	26,156	3,749	207	332	846	1,875	1,661	1,816	74,084	134	185	1,036	0 75,439
May	27,740	36,289	4,473	575	309	848	1,977	2,752	1,800	76,963	134	315	761	50 78,223
June	31,198	29,337	3,525	815	286	603	1,983	2,869	2,516	73,132	142	393	905	103 74,675
July	**37,826**	**20,989**	**4,106**	**555**	**211**	**1,164**	**1,752**	**1,729**	**1,957**	**70,289**	125	407	423	52 71,296
Aug.	40,990	21,154	5,683	432	133	566	772	2,328	2,357	74,415	143	442	1,212	50 76,262
Sept.	40,984	20,447	4,053	606	104	421	1,758	1,949	2,248	72,570	94	441	1,146	17 74,268
Oct.	29,007	28,162	5,932	918	366	1,040	1,684	2,679	2,751	72,539	180	319	1,270	43 74,351
Nov.	**32,734**	**17,401**	**4,288**	**1,524**	749	455	1,141	2,303	2,406	63,001	123	524	966	63 64,677
Dec.	**30,434**	**13,775**	**4,942**	**1,979**	**1,049**	171	1,233	3,079	4,793	61,455	119	759	1,367	81 63,781
1936														
Jan.	26,624	20,778	4,178	419	874	938	2,317	1,665	2,449	60,242	111	494	1,796	70 62,713
Feb.	19,686	27,991	3,664	871	511	529	2,111	3,663	2,894	61,920	157	620	1,177	75 63,949
Mar.	34,599	19,393	4,336	750	574	342	1,848	2,966	2,553	67,361	120	600*	1,175	40 69,296
Apr.	21,387	25,047	3,172	438	817	869	2,053	1,596	2,417	57,796	140*	600*	1,044	50* 59,630

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

BUSINESS OPPORTUNITIES

HAVE RUBBER PLANT IN NEW JERSEY FOR SALE OR RENT. Will alter to suit tenant. Address Box No. 673, care of INDIA RUBBER WORLD.

(Advertisements continued on page 83)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	April, 1936		Four Months Ended April, 1936	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	99,047,998	$13,967,712	319,992,901	$41,745,196
Liquid latex	3,610,511	522,049	13,808,801	1,821,420
Jelutong or pontianak	1,681,317	146,548	4,883,333	435,691
Balata	85,775	15,232	520,866	84,135
Gutta percha	498,825	87,291	1,340,843	239,889
Guayule	230,400	19,469	644,400	54,383
Siak, scrap, reclaimed, etc.	1,512,592	38,021	4,476,247	94,292
Totals	106,667,418	$14,796,322	345,667,391	$44,475,006
Chicle, crude—*Free*	989,354	$265,687	3,740,611	$931,206
MANUFACTURED—*Dutiable*				
Rubber tires—*number*	4,090	$18,871	46,913	$302,795
Rubber boots, shoes, and overshoes—*pairs*	15,567	1,135	21,142	4,605
Rubber soled footwear with fabric uppers—*pairs*	126,748	23,002	322,100	80,585
Golf balls—*number*	97,584	16,102	213,954	34,727
Lawn tennis balls—*number*	80,160	8,296	292,239	26,059
Other rubber balls—*number*	650,817	23,763	1,820,939	60,337
Other rubber toys, except balls	73,887	9,755	299,541	37,504
Hard rubber combs—*number*	40,636	2,185	198,028	11,212
Other manufactures of hard rubber	.....	2,021	.....	9,139
Friction or insulating tape	31,342	1,565	81,482	4,063
Belts, hose, packing, and insulating material	.....	22,144	.....	82,573
Druggists' sundries of soft rubber	.....	8,285	.....	34,430
Inflatable swimming belts, floats, etc.—*number*	116,856	8,551	343,410	19,526
Other manufactures	123,396	21,466	466,930	80,962
Totals	.....	$167,141	.....	$788,517

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	2,205,055	$343,785	7,870,567	$1,163,421
Balata	7,223	1,498	77,475	19,364
Gutta percha, rubber substitutes, and scrap	2,000	300	43,686	3,241
Rubber manufactures	.....	1,335	.....	5,238
Totals	.....	$346,918	.....	$1,191,264

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,318,675	$63,391	4,941,952	$232,516
Scrap	3,386,884	64,350	13,816,195	273,917
Cements—*gal.*	22,283	16,053	69,662	52,268
Rubberized automobile cloth—*sq. yd.*	47,909	21,674	152,296	71,742
Other rubberized piece goods and hospital sheeting—*sq. yd.*	125,676	45,246	421,699	161,701
Footwear				
Boots—*pairs*	3,669	8,197	32,898	75,083
Shoes—*pairs*	52,705	15,776	104,409	41,135
Canvas shoes with rubber soles—*pairs*	18,907	10,500	63,944	37,303
Soles—*doz. prs.*	1,239	2,371	7,619	13,564
Heels—*doz. prs.*	46,651	24,465	142,767	84,833
Soling and top lift sheets	32,536	10,085	122,439	25,630
Gloves and mittens—*doz. prs.*	5,708	13,730	18,837	44,058
Water bottles and fountain syringes—*number*	21,512	7,960	60,008	25,353
Other druggists' sundries	.....	53,739	.....	159,442
Gum rubber clothing—*doz.*	7,087	12,653	37,275	52,468
Balloons—*gross*	22,711	21,566	105,193	89,214
Toys and balls	.....	6,253	.....	19,526
Bathing caps—*doz.*	6,921	12,373	26,168	47,107
Bands	28,613	9,675	85,834	29,720
Erasers	36,121	21,677	117,297	70,872
Hard rubber goods				
Electrical hard rubber goods	.....	14,296	.....	67,980
Other hard rubber goods	.....	16,893	.....	79,274
Tires				
Truck and bus casings—*number*	17,894	323,437	60,150	1,134,708
Other automobile casings—*number*	64,572	598,402	240,071	2,149,169
Tubes, auto—*number*	65,292	111,412	214,568	354,862
Other casings and tubes—*number*	2,604	11,216	10,877	38,967
Solid tires for automobiles and motor trucks—*number*	502	13,734	1,762	47,998
Other solid tires	97,029	15,552	276,239	43,947
Tire sundries and repair materials	.....	57,560	.....	168,873
Rubber and friction tape	55,711	16,218	224,708	56,893
Belts and belting	254,427	141,127	852,812	442,814
Hose	390,822	158,101	1,562,052	512,819
Packing	148,320	59,911	516,876	205,744
Mats, matting, flooring, and tiling	171,793	22,812	547,998	65,858
Thread	100,893	79,087	449,776	247,987
Gutta-percha manufactures	125,652	28,068	266,781	68,693
Other rubber manufactures	.....	109,192	.....	430,030
Totals	.....	$2,218,752	.....	$7,724,068

Rubber Goods Production Statistics

	1936		1935	
TIRES AND TUBES*	Jan.	Feb.	Jan.	Feb.
Pneumatic casings				
Production—*thousands*	3,709	2,898	4,488	4,251
Shipments, total—*thousands*	3,139	2,601	3,553	3,189
Domestic—*thousands*	3,079	2,545	3,469	3,112
Stocks, end of month—*thousands*	7,224	7,504	10,086	11,184
Solid and cushion tires				
Production—*thousands*	25	15	22	18
Shipments, total—*thousands*	23	17	20	16
Domestic—*thousands*	22	17	20	16
Stocks, end of month—*thousands*	40	37	32	32
Inner tubes				
Production—*thousands*	3,719	2,880	4,131	4,046
Shipments, total—*thousands*	3,376	2,791	3,610	3,261
Domestic—*thousands*	3,330	2,748	3,539	3,200
Stocks, end of month—*thousands*	6,984	7,046	9,332	10,152
Raw material consumed				
Fabrics—*thous. of lbs.*	15,988	12,059	19,608	18,059
MISCELLANEOUS PRODUCTS				
Rubber bands, shipments—*thous. of lbs.*	....	....	230	228
Rubber-proofed fabrics, production, total—*thous. of yds.*	2,864	2,950	3,776	3,661
Auto fabrics—*thous. of yds.*	219	191	286	287
Raincoat fabrics—*thous. of yds.*	603	786	1,141	1,122
Rubber flooring, shipments—*thous. of sq. ft.*	371	322	268	286
Rubber and canvas footwear				
Production, total—*thous. of prs.*	5,925	5,231	5,668	5,383
Tennis—*thous. of prs.*	2,174	2,498	2,668	3,083
Waterproof—*thous. of prs.*	3,751	2,732	2,999	2,300
Shipments, total—*thous. of prs.*	6,144	4,819	6,379	4,752
Tennis—*thous. of prs.*	2,061	1,929	2,778	3,284
Waterproof—*thous. of prs.*	4,083	2,890	3,601	1,468
Shipments, domestic, total—*thous. of prs.*	6,109	4,788	6,250	4,619
Tennis—*thous. of prs.*	2,042	1,915	2,661	3,165
Waterproof—*thous. of prs.*	4,067	2,873	3,589	1,454
Stocks, total, end of month—*thous. of prs.*	14,886	14,957	14,466	15,087
Tennis—*thous. of prs.*	6,839	7,305	6,890	6,690
Waterproof—*thous. of prs.*	8,047	7,652	7,576	8,397

*Data for 1934 and for January to July, 1935, are estimated to represent approximately 97% of the industry; for August, September, October, November, and December, 1935, the coverage is estimated to be 81%.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	April, 1936		April, 1935	
	*Crude Rubber		*Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	3,956,783	$562,093	6,128,658	$701,102
New York	78,529,972	11,189,149	77,074,001	8,787,015
Philadelphia	3,157,453	497,855	589,473	76,031
Maryland	1,326,841	172,559	238,520	24,175
Mobile	193,760	28,740	1,214,826	134,498
New Orleans	627,200	86,636	714,050	77,597
Los Angeles	14,174,391	1,849,068	5,555,202	632,159
San Francisco	625,044	86,884	531,540	64,326
Oregon	33,600	4,949	.....	.....
Ohio	151,865	17,349	145,776	14,684
Colorado	112,000	13,948	.....	.....
Totals	102,888,909	$14,509,230	92,192,046	$10,511,587

*Crude rubber including latex dry rubber content.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2135	Manufacturer of adhesive felt for chiropodists.
2136	Supplier of pre-vulcanized latex.
2137	Manufacturer of rubber collets.
2138	Manufacturer of cold curing cement.
2139	Manufacturer of a lacquer that will stand up on the resilient surface of sponge rubber.
2140	Supplier of 50/50 master batch of smoked sheets and channel carbon black, with or without plastifiers.
2141	Supplier of master batch of smoked sheets and glue.
2142	Supplier of magnesium carbonate.
2143	Supplier of titanium dioxide.
2144	Supplier of lithopone.
2145	Information wanted on impregnating steel with rubber.
2146	Manufacturer of synthetic washers.
2147	Manufacturer of Wolfe calender gage.
2148	Seller of second-hand hydraulic press.
2149	Manufacturer of liquid black phenolic varnish.
2150	Supplier of common gutta percha.
2151	Supplier of natural chicle.
2152	Manufacturer of equipment for making toy balloons and sanitary rubber goods.
2153	Information wanted on the value and use of balata oil.
2154	Manufacturer of skin coat fabrics for collapsible boats.
2155	Manufacturer of rubber band cutters.
2156	Supplier of finely ground and unground tire tread waste free from fabric.
2157	Supplier of reclaimed rubber suitable for making soles and heels.
2158	Seller of used spreaders.

New Publications

(Continued from page 74)

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Traffic managers and shipping departments will find this book indispensable. It contains two major sections. Section One concisely and clearly covers over 2,500 authentic definitions of domestic and foreign trade and shipping terms, phrases, expressions, and abbreviations. Fully explained, they are arranged alphabetically and are completely cross-indexed. Section Two is an appendix describing and illustrating shipping room equipment and supplies. The value and importance of the appendix lies in its up-to-the-minute information regarding modern shipping methods which lead to better service, decreased transportation costs, and increased profits.

"Workshop Receipts for Manufacturers and Scientific Amateurs." Vol. IV. New and Revised Edition. The Chemical Publishing Co., New York, N. Y. Cloth, 543 pages, 4¼ by 7 inches. Indexed. Illustrated. Price $2.50 per volume.

The volume at hand is one of a set of four volumes of workshop receipts. These practical books have been sold in England to chemists, engineers, scientists, executives, colleges, manufacturers, farmers, mechanics, home experimenters, and home owners, with great satisfaction to all. Although it contains many formulae, it is not a formula book. It details processes, manipulations, and handy methods which are the results of years of experience of practical experts. For the first time are revealed many invaluable trade processes and secrets. Explicit details and many hundreds of illustrations are given. Volume IV covers the alphabet from R to W and includes such items as refrigeration, rubber stamps, type, and rubber stamp ink, sandblast processes, stuffing box packing, tile laying, valve grinding, varnishes, waterproofing, etc.

T.I.

A new product known as T.I., for which a patent is pending, has been introduced for thickening vulcanized latex compounds such as those for dipped and spread goods and general purposes. The material, a clear liquid of light amber color, may be added directly to the latex solution under slow speed agitation to avoid entrapping air in the mixing. It has no effect on vulcanization.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*891	Liquid or paste rubber for making casting molds	Montreal, Canada
†898	Vulcanizing material, such as cement and camel back material.	Johannesburg, South Africa
†923	Belting	Calcutta, India
*932	Tire repairing compounds	Medan, Sumatra
‡941	Power transmission belting	Bombay, India
†957	Sport goods	Cairo, Egypt
*968	Latex machinery and equipment as dipping machines, vulcanizing cabinet, and calenders	Kaunas, Lithuania
†1,004	Sanitary goods and rubber and cork bath mats	Johannesburg, South Africa
†1,025	Chlorinated rubber for making varnish, etc..	Boulogne sur Seine, France
*1,028	Automobile flooring...	Oslo, Norway

*Purchase. †Agency. ‡Purchase and agency.

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania Total	Oceania	Africa	South America	Mexican Guayule	Grand Total
1933	**445,800**	**282,300**	**63,800**	**1,400**	**3,400**	**7,800**	**11,100**	**7,000**	**17,300**	**839,900**	**1,100***	**2,000**	**10,100**	**0**	**853,100**
1934	**467,000**	**379,400**	**79,100**	**6,500**	**6,300**	**11,100**	**17,700**	**17,700**	**19,600**	**1,004,400**	**1,200***	**2,900**	**9,100**	**400**	**1,018,000**
1935															
Jan.	41,665	18,726	6,294	782	315	1,238	1,536	2,614	2,575	75,745	105	467	1,525	0	77,842
Feb.	32,824	28,019	5,551	383	487	760	1,880	2,288	2,018	74,210	156	254	696	0	75,316
Mar.	34,047	22,403	1,720	278	373	773	1,874	2,076	1,440	64,984	82	525	887	0	66,478
Apr.	37,442	26,156	3,749	207	332	846	1,875	1,661	1,816	74,084	134	185	1,036	0	75,439
May	27,740	36,289	4,473	575	509	848	1,977	2,752	1,800	76,963	134	315	761	50	78,223
June	31,198	29,337	3,525	815	286	603	1,983	2,869	2,516	73,132	142	393	905	103	74,675
July	37,826	20,989	4,106	555	211	1,164	1,752	1,729	1,957	70,289	125	407	423	52	71,296
Aug.	40,990	21,154	5,683	432	133	566	772	2,328	2,357	74,415	143	442	1,212	50	76,262
Sept.	40,984	20,447	4,053	606	104	421	1,758	1,949	2,248	72,570	94	441	1,146	17	74,268
Oct.	29,007	28,162	5,932	918	366	1,040	1,684	2,679	2,751	72,539	180	319	1,270	43	74,351
Nov.	32,734	17,401	4,288	1,524	749	455	1,141	2,303	2,406	63,001	123	524	966	63	64,677
Dec.	30,434	13,775	4,942	1,979	1,049	171	1,233	3,079	4,793	61,455	119	759	1,367	81	63,781
1936															
Jan.	26,624	20,778	4,178	419	874	938	2,317	1,665	2,449	60,242	111	494	1,796	70	62,713
Feb.	19,686	27,991	3,664	871	511	529	2,111	3,663	2,894	61,920	157	620	1,177	75	63,949
Mar.	34,599	19,393	4,336	750	574	342	1,848	2,966	2,553	67,361	120	600*	1,175	40	69,296
Apr.	21,387	25,047	3,172	438	817	869	2,053	1,596	2,417	57,796	140*	600*	1,044	50*	59,630

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

BUSINESS OPPORTUNITIES

HAVE RUBBER PLANT IN NEW JERSEY FOR SALE OR RENT. Will alter to suit tenant. Address Box No. 673, care of INDIA RUBBER WORLD.

(*Advertisements continued on page* 83)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	April, 1936		Four Months Ended April, 1936	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	99,047,998	$13,967,712	319,992,901	$41,745,196
Liquid latex	3,610,511	522,049	13,808,801	1,821,420
Jelutong or pontianak	1,681,317	146,548	4,883,333	435,691
Balata	85,775	15,232	520,866	84,135
Gutta percha	498,825	87,291	1,340,843	239,889
Guayule	230,400	19,469	644,400	54,383
Siak, scrap, reclaimed, etc.	1,512,592	38,021	4,476,247	94,292
Totals	106,667,418	$14,796,322	345,667,391	$44,475,006
Chicle, crude—*Free*	989,354	$265,687	3,740,611	$931,206
MANUFACTURED—*Dutiable*				
Rubber tires—*number*	4,090	$18,871	46,913	$302,795
Rubber boots, shoes, and overshoes—*pairs*	15,567	1,135	21,142	4,605
Rubber soled footwear with fabric uppers—*pairs*	126,748	23,002	322,100	80,585
Golf balls—*number*	97,584	16,102	213,954	34,727
Lawn tennis balls—*number*	80,160	8,296	292,239	26,059
Other rubber balls—*number*	650,817	23,763	1,820,939	60,337
Other rubber toys, except balls	73,887	9,755	299,541	37,504
Hard rubber combs—*number*	40,636	2,185	198,028	11,212
Other manufactures of hard rubber	.....	2,021	.....	9,139
Friction or insulating tape	31,342	1,565	81,482	4,063
Belts, hose, packing, and insulating material	.....	22,144	.....	82,573
Druggists' sundries of soft rubber	.....	8,285	.....	34,430
Inflatable swimming belts, floats, etc.—*number*	116,856	8,551	343,410	19,526
Other manufactures	123,396	21,466	466,930	80,962
Totals	.....	$167,141	.....	$788,517

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	2,205,055	$343,785	7,870,567	$1,163,421
Balata	7,223	1,498	77,475	19,364
Gutta percha, rubber substitutes, and scrap	2,000	300	43,686	3,241
Rubber manufactures	.....	1,335	.....	5,238
Totals	.....	$346,918	.....	$1,191,264

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,318,675	$63,391	4,941,952	$232,516
Scrap	3,386,884	64,350	13,816,195	273,917
Cements—*gal.*	22,283	16,053	69,662	52,268
Rubberized automobile cloth—*sq. yd.*	47,909	21,674	152,296	71,742
Other rubberized piece goods and hospital sheeting—*sq. yd.*	125,676	45,246	421,699	161,701
Footwear				
Boots—*pairs*	3,669	8,197	32,898	75,083
Shoes—*pairs*	52,705	15,776	104,409	41,135
Canvas shoes with rubber soles—*pairs*	18,907	10,500	63,944	37,303
Soles—*doz. prs.*	1,239	2,371	7,619	13,564
Heels—*doz. prs.*	46,651	24,465	142,767	84,833
Soling and top lift sheets	32,536	10,085	122,439	25,630
Gloves and mittens—*doz. prs.*	5,708	13,730	18,837	44,058
Water bottles and fountain syringes—*number*	21,512	7,960	60,008	25,353
Other druggists' sundries	.....	53,739	.....	159,442
Gum rubber clothing—*doz.*	7,087	12,653	37,275	52,468
Balloons—*gross*	22,711	21,566	105,193	89,214
Toys and balls	.....	6,253	.....	19,526
Bathing caps—*doz.*	6,921	12,373	26,168	47,107
Bands	28,613	9,675	85,834	29,720
Erasers	36,121	21,677	117,297	70,872
Hard rubber goods				
Electrical hard rubber goods	.....	14,296	.....	67,980
Other hard rubber goods	.....	16,893	.....	79,274
Tires				
Truck and bus casings, *number*	17,894	323,437	60,150	1,134,708
Other automobile casings, *number*	64,572	598,402	240,071	2,149,169
Tubes, auto—*number*	65,292	111,412	214,568	354,862
Other casings and tubes, *number*	2,604	11,216	10,877	38,967
Solid tires for automobiles and motor trucks—*number*	502	13,734	1,762	47,998
Other solid tires	97,029	15,552	276,239	43,947
Tire sundries and repair materials	.....	57,560	.....	168,873
Rubber and friction tape	55,711	16,218	224,708	56,893
Belts and belting	254,427	141,127	852,812	442,814
Hose	390,822	158,101	1,562,052	512,819
Packing	148,320	59,911	516,876	205,744
Mats, matting, flooring, and tiling	171,793	22,812	547,998	65,858
Thread	100,893	79,087	449,776	247,987
Gutta-percha manufactures	125,652	28,068	266,781	68,693
Other rubber manufactures	.....	109,192	.....	430,030
Totals	.....	$2,218,752	.....	$7,724,068

Rubber Goods Production Statistics

TIRES AND TUBES*		1936		1935	
Pneumatic casings		Jan.	Feb.	Jan.	Feb.
Production	*thousands*	3,709	2,898	4,488	4,251
Shipments, total	*thousands*	3,139	2,601	3,553	3,189
Domestic	*thousands*	3,079	2,545	3,469	3,112
Stocks, end of month	*thousands*	7,224	7,504	10,086	11,184
Solid and cushion tires					
Production	*thousands*	25	15	22	18
Shipments, total	*thousands*	23	17	20	16
Domestic	*thousands*	22	17	20	16
Stocks, end of month	*thousands*	40	37	32	32
Inner tubes					
Production	*thousands*	3,719	2,880	4,131	4,046
Shipments, total	*thousands*	3,376	2,791	3,610	3,261
Domestic	*thousands*	3,330	2,748	3,539	3,200
Stocks, end of month	*thousands*	6,984	7,046	9,332	10,152
Raw material consumed					
Fabrics	*thous. of lbs.*	15,988	12,059	19,608	18,059
MISCELLANEOUS PRODUCTS					
Rubber bands, shipments	*thous. of lbs.*	....	....	230	228
Rubber-proofed fabrics, production, total	*thous. of yds.*	2,864	2,950	3,776	3,661
Auto fabrics	*thous. of yds.*	219	191	286	287
Raincoat fabrics	*thous. of yds.*	603	786	1,141	1,122
Rubber flooring, shipments	*thous. of sq. ft.*	371	322	268	286
Rubber and canvas footwear					
Production, total	*thous. of prs.*	5,925	5,231	5,668	5,383
Tennis	*thous. of prs.*	2,174	2,498	2,668	3,083
Waterproof	*thous. of prs.*	3,751	2,732	2,999	2,300
Shipments, total	*thous. of prs.*	6,144	4,819	6,379	4,752
Tennis	*thous. of prs.*	2,061	1,929	2,778	3,284
Waterproof	*thous. of prs.*	4,083	2,890	3,601	1,468
Shipments, domestic, total	*thous. of prs.*	6,109	4,788	6,250	4,619
Tennis	*thous. of prs.*	2,042	1,915	2,661	3,165
Waterproof	*thous. of prs.*	4,067	2,873	3,589	1,454
Stocks, total, end of month	*thous. of prs.*	14,886	14,957	14,466	15,087
Tennis	*thous. of prs.*	6,839	7,305	6,890	6,690
Waterproof	*thous. of prs.*	8,047	7,652	7,576	8,397

*Data for 1934 and for January to July, 1935, are estimated to represent approximately 97% of the industry; for August, September, October, November, and December, 1935, the coverage is estimated to be 81%.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	April, 1936		April, 1935	
	*Crude Rubber		*Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	3,956,783	$562,093	6,128,658	$701,102
New York	78,529,972	11,189,149	77,074,001	8,787,015
Philadelphia	3,157,453	497,855	589,473	76,031
Maryland	1,326,841	172,559	238,520	24,175
Mobile	193,760	28,740	1,214,826	134,498
New Orleans	627,200	86,636	714,050	77,597
Los Angeles	14,174,391	1,849,068	5,555,202	632,159
San Francisco	625,044	86,884	531,540	64,326
Oregon	33,600	4,949	.....	.....
Ohio	151,865	17,349	145,776	14,684
Colorado	112,000	13,948	.....	.....
Totals	102,888,909	$14,509,230	92,192,046	$10,511,587

*Crude rubber including latex dry rubber content.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2135	Manufacturer of adhesive felt for chiropodists.
2136	Supplier of pre-vulcanized latex.
2137	Manufacturer of rubber collets.
2138	Manufacturer of cold curing cement.
2139	Manufacturer of a lacquer that will stand up on the resilient surface of sponge rubber.
2140	Supplier of 50/50 master batch of smoked sheets and channel carbon black, with or without plastifiers.
2141	Supplier of master batch of smoked sheets and glue.
2142	Supplier of magnesium carbonate.
2143	Supplier of titanium dioxide.
2144	Supplier of lithopone.
2145	Information wanted on impregnating steel with rubber.
2146	Manufacturer of synthetic washers.
2147	Manufacturer of Wolfe calender gage.
2148	Seller of second-hand hydraulic press.
2149	Manufacturer of liquid black phenolic varnish.
2150	Supplier of common gutta percha.
2151	Supplier of natural chicle.
2152	Manufacturer of equipment for making toy balloons and sanitary rubber goods.
2153	Information wanted on the value and use of balata oil.
2154	Manufacturer of skin coat fabrics for collapsible boats.
2155	Manufacturer of rubber band cutters.
2156	Supplier of finely ground and unground tire tread waste free from fabric.
2157	Supplier of reclaimed rubber suitable for making soles and heels.
2158	Seller of used spreaders.